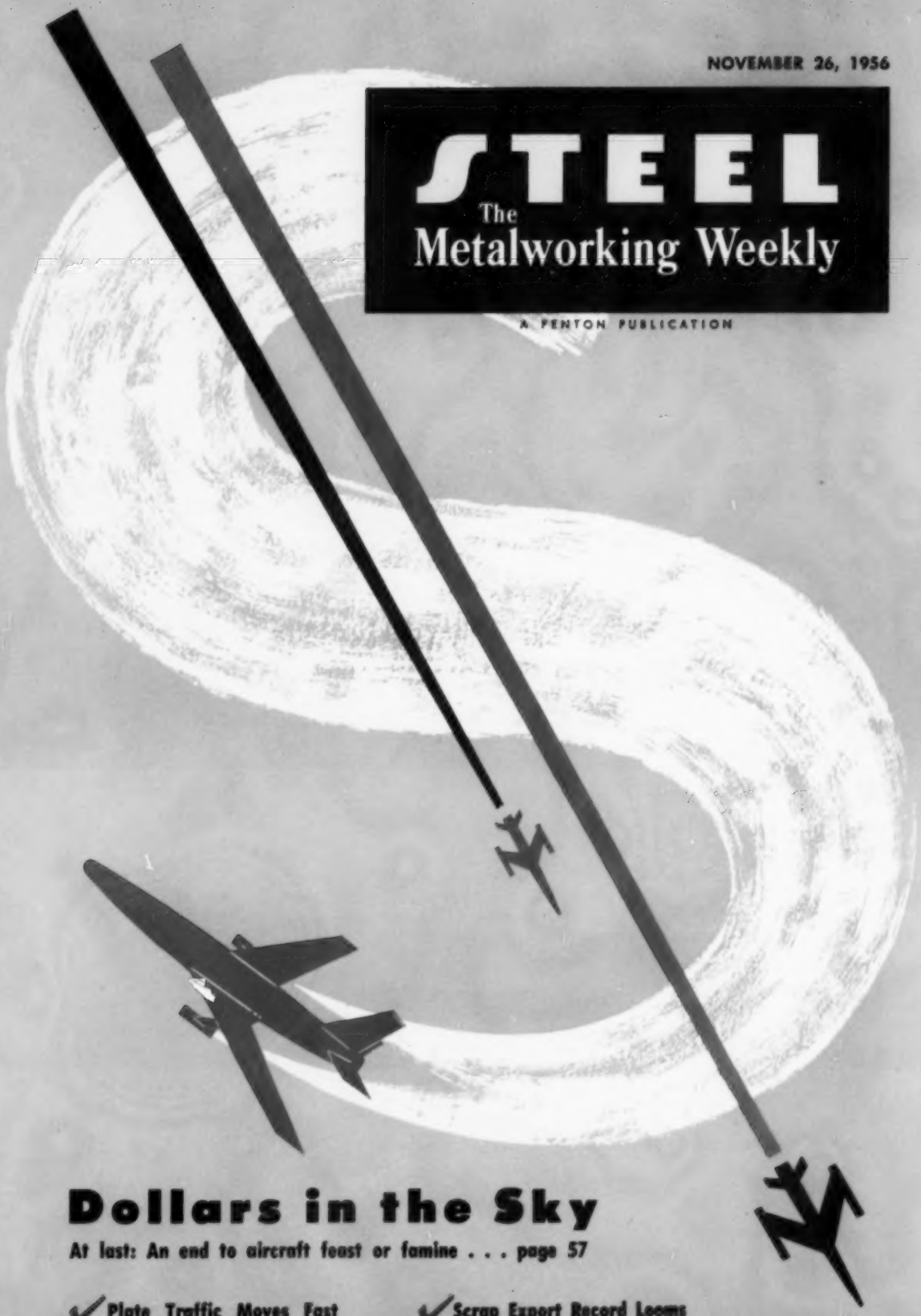
NOVEMBER 26, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Dollars in the Sky

At last: An end to aircraft feast or famine . . . page 57

✔ Plate Traffic Moves Fast —page 90

✔ Scrap Export Record Looms —page 141

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EC&M
Lightweight
55" MAGNET

- HANDLES LIGHT SCRAP AT LOWER COST
- WEIGHS UP TO 25% LESS WITH COMPARABLE LIFTING CAPACITY
- FASTER OPERATION OVER WIDER WORKING RADIUS

This magnet, developed by EC&M engineers, is the lightest weight 55-inch magnet. High strength and water-tight construction are maintained with a completely ALL-WELDED design. Elimination of bolt-head recesses allows a better proportion for coil space, giving high lifting capacity. Welding also keeps pole shoes tight.

The companion EC&M lightweight 45-inch magnet has already become popular because its faster maneuverability and greater working radius permit more trips per day. The larger 55-inch magnet incorporates the same profitable advantages. Get the facts...see how these lightweight magnets can cut *your* light scrap handling costs.

Write for Bulletin 900-L

The companion EC&M 45"Lightweight Magnet, now in wide use on boom-cranes

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

7460

The workman above is installing a Davis brake beam on the truck of a freight car. The special rolled section used in making the beam is shown in the inset.

A special section is the backbone of this railroad car brake beam

Strength—Long Life—Safety. These are the requisites of a railroad car brake beam. That's why the Davis Brake Beam Company, manufacturer of Unit and Hanger type brake beams that are extensively used on freight and passenger cars, construct their product with a hot-rolled carbon-steel special section.

This section consists, in effect, of a round bar and a tee. The customer slits the section from a point near each end, separating the round from the tee. Then, by compressing the beam, he foreshortens the tee, forcing the round outward. The result is what the Davis people call "Solid Truss" construction. Such a brake beam combines strength, durability and reliable performance that cannot be matched by others built up by bolting or by welding.

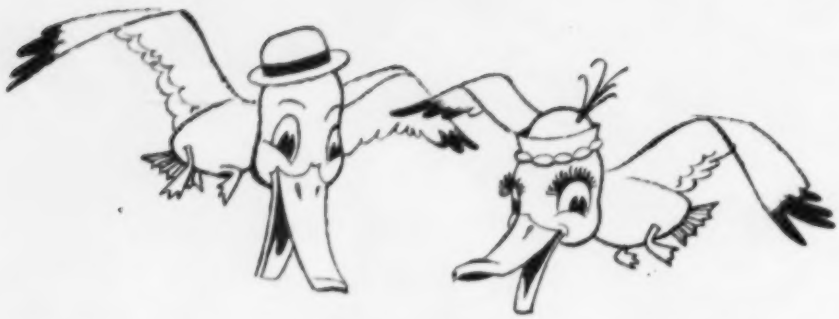
Whatever your product may be, we urge you to consider whether it couldn't be made better with special sections—made *more efficiently*, too, because the use of special sections usually means less machining and fewer fabricating operations. And what company leads in the production of special sections? The nearest Bethlehem district sales office will gladly give you the answer.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

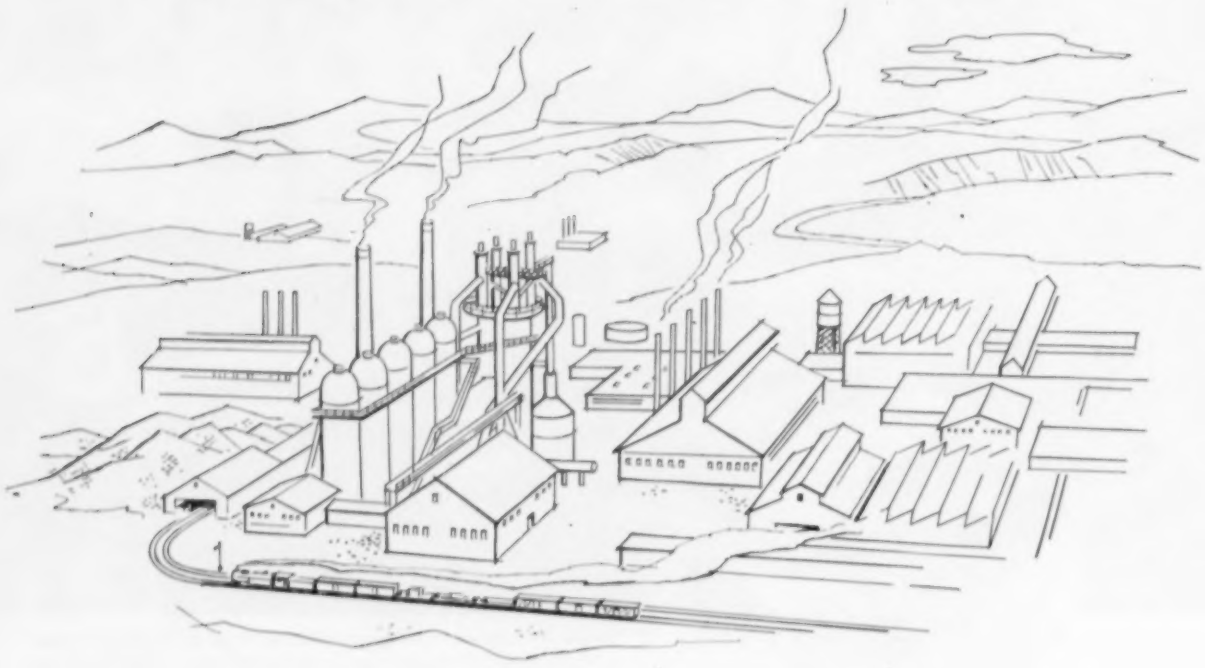
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



Production is smooth as water rolling off your back!



No wonder: **SKF**® has developed a roll neck mounting that meets the demands for higher speeds, closer gauge tolerances, better quality and heavier rolling loads. This multi-row has the features desired by every mill man – most usable capacity in a given space... easy to assemble and disassemble... uses oil or grease, even at high finishing stand speeds.

When you install a new mill, make sure it is equipped with **SKF** multi-row cylindricals. Or have an **SKF** engineer explain how your present mill can be changed over at minimum cost to eliminate roll neck troubles such as breakage, scuffing, excessive bearing failures or high maintenance time and cost. 7737

SKF

EVERY TYPE—EVERY USE

Ball Bearings
Cylindrical Roller Bearings
Spherical Roller Bearings
Tapered Roller Bearings ("Tyson")

* Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

New Answers from Kling to Cut Your Costs in . . .

- **Friction Sawing**
- **Shearing**
- **Punching**
- **Notching**
- **Bending** (Plate and Structural)
- **Mitering**
- **Forming**
- **Coping**

. . . and other operations involved in fabricating steel and non-ferrous metals.

Your answer may be a new Kling Universal Beam Punch equipped for automation . . . or a new Mill-All that does more facing jobs at lower cost . . . or a new Plate Bending Roll for rolling heavy plate sections such as airplane wing skins, pressure vessels, tanks, boat hulls, etc.

Whatever new Kling machine you need, you are assured that it will provide the newest, finest answer to your production problem. New answers to metal working problems have been a specialty with Kling for over 60 years. Why not give Kling engineering an opportunity to show what it can do in cutting your costs? Write today for Data Bulletins on the Kling machines shown above.

Since 1892

Kling

Active Kling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

BROS. ENGINEERING WORKS

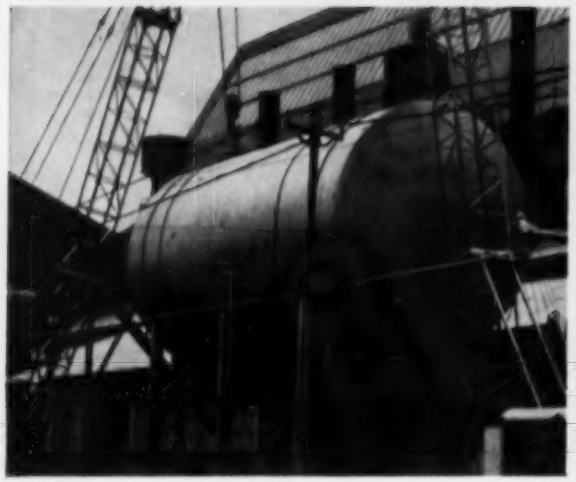
1320 N. KOSTNER AVE. • CHICAGO 51, ILLINOIS

Makers of Friction Saws; Shears—Rotary, Double-Angle and Guillotine; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Bulldozers.

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17, New York

Canadian Distributor: Brown-Boggs Fdry. & Machine Co., Hamilton, Ontario

1117



GOODYEAR INDUSTRIAL PRODUCTS

G.T.M.-Specified Typical Uses for PLIOWELD

(corrosion-resistant rubber lining or covering)

- **Tanks**—rectangular, round, square, open top, flat or dished heads
- **Tank Covers**—flat, box, radius types
- **Truck Tanks**
- **Tank Barges**
- **Railroad Tank Cars**
- **Fans**—blades, wheels, housings
- **Flanged Pipe and Fittings**
- **Fume Hoods and Ducts**
- **Scrubbers and Towers**
- **Air Purifiers**
- **Agitators**
- **Troughs and Chutes**
- **Continuous Vacuum Filters**
- **Pumps**
- **Filter Frames**
- **Miscellaneous Fabricated Items**

PLIOWELD can also be used to combat abrasion

G.T.M. completes another "turn-key" tank lining job

For stream pollution abatement, an eastern steel mill needed a number of big tanks to collect and treat waste pickle liquor—four 45,000-gal. storage tanks, three 41,000-gal. storage and leaching tanks, and five smaller tanks.

The G.T.M.—Goodyear Technical Man—recommended lining the tanks with PLIOWELD—especially compounded corrosion- and abrasion-resistant rubber. He also agreed to handle the complete job "from blueprints to saddles." This included procurement of tanks, lining at fabricator's plant, and movement by barge and truck to customer's plant. And this involved hiring movers and equipment, obtaining rights of way, moving telephone and electrical wires, making police and traffic arrangements.

The net result was a "turn-key" job, delivered as ordered, with no problems for the customer. Like to have your lining job handled the same way? Just turn it over to the G.T.M.! Contact him through your Goodyear Distributor, or write Goodyear, Industrial Products Division, Akron 16, Ohio.

PLIOWELD TANK LININGS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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LARGE OR SMALL HEAT TREATED OR PLAIN

SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

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Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings, and industrial V-belts.

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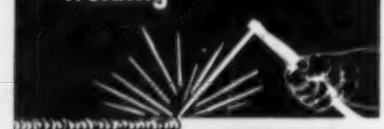
When one welder gives both AC and DC...

Handles every type of electrode...

Yet costs less to buy and operate...

WHY shouldn't you be using LINCOLN IDEALARCS for your production welding



Ask THE LINCOLN ELECTRIC COMPANY
Dept. 4408 • Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment

behind the scenes

Watch Our Style

Habitual readers of STEEL may have noted a gradual and subtle change in the manner in which its contents have been presented. Persons not obliged to be concerned about the assembly of words into sentences are naturally reluctant to do handsprings in the presence of sparkling syntax; with most adults, it is sufficient to read what is wrote, and if it ain't wrote right, skip it. If the editors and publishers of succeeding generations didn't accept changes and improvements in written English, we'd have a rough time today trying to read the stuff, let alone write it. Imagine trying to plow through STEEL's "Metalworking Outlook" written after the style of Beowulf's letters to his creditors!

The contents of STEEL are edited right to the bone, and the material that appears must first be important enough to warrant its inclusion (there's a stilted example of saying "has to be good enough to get in"). Second, it has to be written clearly and logically, with a maximum of meat and a minimum of trimming. Finally, STEEL's copy editor, Harry Chandler, refuses to be arbitrarily bound by grammar.

Did you notice that split infinitive? Harry says you can stumble around up to your wrists in assorted parts of speech trying to avoid a split infinitive, when you might just as well put the words where you wanted to in the first place. The chances are you'll be better understood, too.

An Outside Assist

Everything is written for you, the reader, so you deserve to know whether our business journalists are playing fast and loose with accepted rules on writing. We didn't want the news to get around that Chandler was flouting grammar simply to impress his old river-front cronies in Evansville, Ind.; actually, he was sidestepping some of the rules in the interest of clarity.

In support of Chandler's contention that what's wrote is right if it's writ plain and easy, Charles A. Shaw, advertising manager of Tekni-Craft, Rockton, Ill., writes in *Advertising Age*, "Grammar is so much hay—Forget it!" Mr. Shaw studies grammar as a hobby, and the things he has revealed will delight the soul of every school child.

"No discoverable relationship," writes Mr. Shaw, "exists between knowledge of grammar and ability to use or understand language. What's more, traditional grammar has even been proved ineffective and futile in eliminating errors."

In this connection we may as well quote Sir Winston Churchill. A secretary had gone over one of his reports, and had taken the liberty of transposing a preposition. On the margin he wrote: "A sentence shouldn't end with a preposition." Sir Winston promptly restored the sentence, and scrawled for the secretary's benefit: "This type of editing is something up with which I will not put."

Copy Editor Chills

Chandler had some free time over the week end to contemplate additional style changes in STEEL's editorial matter. Trapped by his 6-year-old son and a YMCA secretary, he spent a night with a group of Indian Guides in a deep freeze unit built of logs. One shameless member attempted to smuggle in six cans of beer, but the secretary's sixth sense circumvented the scandal, and brought the fellow to his senses. It was almost too cold to drink beer, anyway. When night fell, the children drew most of the blankets, and sensibly went to sleep. Their fathers sat around shivering, and were it at all possible, it would be interesting to run a transcript of their private remarks.

"You can have mine," said Chandler. "The secretary allowed us to play cards for paper matches, on account of he wanted us to have a real gay time. We were all Indian Guides, you know, living close to nature. Well, I filled an inside straight to the tune of 18 matches just before lights out, and do you know what I thought? I thought, Wow! Even in a high wind, I would have 18 chances to set this whole park on fire!"

Shrdlu

(Metalworking Outlook—Page 51)

HOT or COLD these chutes WORK...

THANKS TO *a special* STAINLESS STEEL!

Courtesy: Switlik Parachute Co., Inc.
John Evans' Sons, Inc.

In the sweltering tropics or sub-zero north, these new Navy parachutes give fool-proof service . . . thanks to the properties of a newly developed stainless steel.

Lighter and far more compact than conventional models—these chutes depend on springs channeled in the fabric—to exert tension when the chute is packed, then provide split-second opening when the rip cord is pulled. Initial designs called for springs of carbon steel until problems of corrosion, and embrittlement from sub-zero temperatures revealed the need for a more suitable steel.

Frasse engineers, invited to collaborate, recommended 17-7 PH—a precipitation hardening stainless grade that provided the required resistance to corrosion and embrittlement . . . made possible a single low temperature heat treatment with practically no distortion. Net result—a problem solved, a more durable, safer product, and 20% reduction in fabricating cost.

New steels and new uses for established grades are the continuing study of Frasse engineers. Consult them on your next steel problem—chances are they can recommend a steel to save money, increase production or improve *your* product. There's no obligation. Just call or write your nearest Frasse office.

Call FRASSE 1st for STAINLESS STEEL

Bars, Strip, Wire — Sheets, Tubing, Valves — Plates, Pipe, Fittings

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Peter A. Frasse & Co., Inc.
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Please send me your new brochure containing data on stainless steel.

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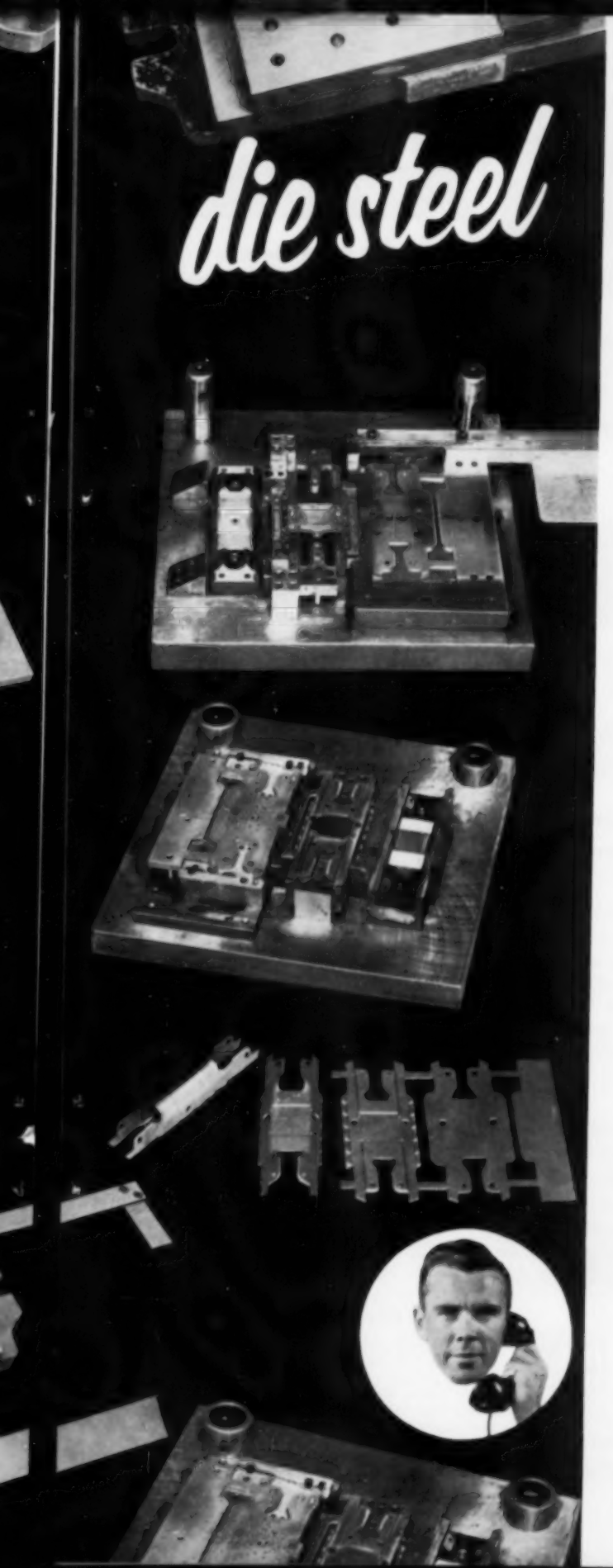

. . . for hundreds of dies like these. Every blueprint specifies "*Carpenter* No. 484 —will accept no substitute"

when you want *RESULTS* . . .

work with tool and die steels that are especially engineered for improvements in products, equipment and methods. For example, this manufacturer of scale model toys discovered that it pays to work with the finest tool and die steels available. So-called "bargain tool steel prices" were actually costing him *more* in extra finishing and maintenance. That's why every blueprint for their toy dies now specifies, "Carpenter No. 484 (Air-Hard)—will accept no substitute." Results: several million parts per sharpening . . . or a 50% increase in output per grind. The chief engineer reports, "No. 484 is the most economical steel for our work from the standpoint of die life and maintenance. We never have die problems when a job goes into production."

For a complete story on this job, ask your Carpenter representative to show you "Fact File No. 2026." This Report is one of hundreds based on actual plant records given to us by industry to prove conclusively the improved performance obtained with Carpenter Matched Tool and Die Steels. When will you join the growing number of plants who are enjoying better, lower-cost results like these?

when you want *ACTION* . . .

plus economies in your use of specialty steels, dial your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. Service was never faster or better than it is today on Matched Tool and Die Steels, Free-Machining Stainless Steels, and Special-Purpose Alloys from warehouse shelves. You can practically set your own timetable on delivery of a few pounds or a truck-load. No need to stockpile steel in your plant for future use. Call the order desk man who answers your nearest Carpenter number. He's set to give you real service on specialty steels.

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Matched Tool and Die Steels

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Mill-Branch Warehouses, Offices and Distributors in Principal U. S. Cities

FENN INTRODUCES A . . .

NEW LARGE
LABORATORY ROLLING MILL

Ferrous Strip Reductions
Up To .080" Per Pass.

Maximum Separating Force
300,000 Pounds At 100 fpm.

PERMITS HEAVY REDUCTIONS IN THE LABORATORY ON FERROUS STRIP

Fenn's new Model 4-083 Combination Type Laboratory Rolling Mill, a companion to the popular smaller Fenn Mill, is capable of taking heavy reductions on ferrous strip at all speeds between 100 fpm and 500 fpm. The mill (2½" x 8⅜" x 8") can be used as a two-high mill, or as a four-high mill featuring driven back-up rolls or work rolls, and many drive combinations are possible to meet customer specifications. Important features of the new mill include a dual motor power screw-down unit, force feed lubrication system, and auxiliary operator control stations.

FENN

COMPLETE MILL SPECIFICATIONS
sent upon request.
Fenn engineering service is available to help you solve your rolling problems.

Precision Rolling Mills

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Wire and Tube Drawing Machines

THE FENN MANUFACTURING COMPANY, 405 FENN ROAD, NEWINGTON, CONNECTICUT

LETTERS
TO THE EDITORS

Reprints to Plant Managers

We find the article, "Automation—Bogeyman or Bonanza?" (Oct. 15, page 109), to be interesting reading. We would like 50 reprints to distribute at a plant managers' meeting in Omaha on Nov. 28-29.

W. C. Bennett
Advertising Co-ordinator
Industrial Products
Vickers Inc.
Division of Sperry Rand Corp.
Detroit

Enjoys STEEL Covers

As a part of the steel business, I am sure you are well acquainted with the usual dull, dry periodicals put out. To one who comes into contact with such material every day, yours is a welcome relief.

As a secretary (and a student in commercial art at the Atlanta Art Institute), I come into contact with your magazine regularly. I just wanted to take this opportunity to drop you a note and tell you how much I enjoy your covers.

Sharon Rae Turco
Golian Steel & Iron Co.
Atlanta

Highway Plan to Ike Adviser

David W. Lusher (Council of Economic Advisers—Executive Office of the President) would appreciate a copy of the article, "Highway Plan: Road to Profit" (Oct. 29, page 79).

Margery B. Hudson
Council of Economic Advisers
Executive Office of the President
Washington

Plant Outlaws Air

I would appreciate a reprint of the article, "The Plant That Outlaws Air" (Oct. 22, page 78). It sounds fantastic, but sure is interesting!

F. W. Welsh
Project Engineer
National Tube Division
United States Steel Corp.
Pittsburgh

Puts Bite on STEEL

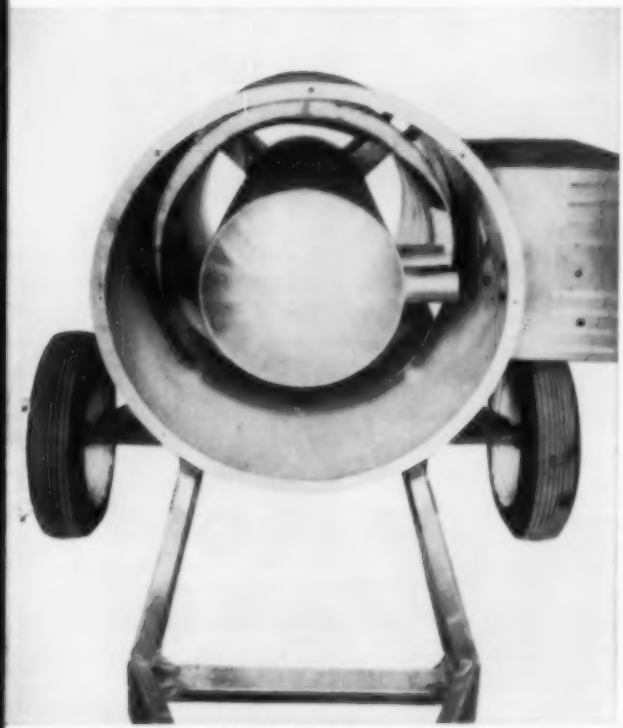
In the past, we have had occasion to compliment STEEL for the excellence of the articles in your management series. On such occasions, we have put the bite on you for some particular article which was unusually appropriate.

Again, we come to you—the occasion this time being No. 8 in your current

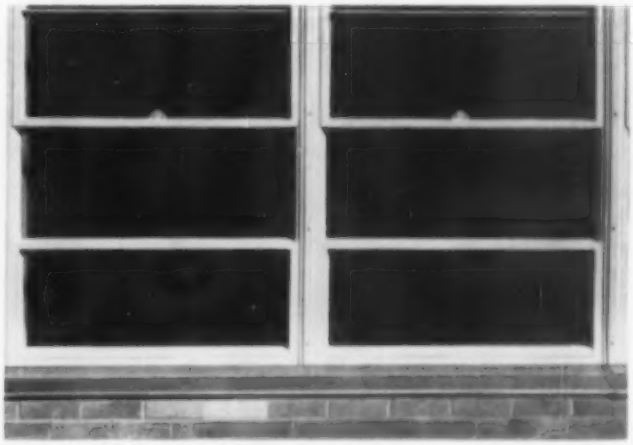
(Please turn to page 12)

FOR TRAILERS THAT DO NOT WEAR OUT. This Fruehauf trailer has sides made from thin sheets of Stainless Steel, corrugated into walls that are only one inch thick. That's why it can carry more cargo than trailers of other, heavier types of construction. Most joints are welded, an easy job with Stainless. There is nothing to corrode or loosen; in fact, no Stainless trailer has ever worn out!

NOTHING *can equal Stainless Steel*



FOR HEAT RESISTANCE. This is a Lennox Crop Dryer. It burns 12 gallons of fuel oil per hour and has an input of 2,000,000 BTU. Wherever the heat is most intense, type 430 Stainless Steel is used. It is especially important for the combustion chamber and emitting tubes.



FOR ARCHITECTURAL USE. This Dawson Floating Sill is made from type 302 Stainless Steel. It combines fine appearance with the enduring properties of Stainless Steel. The finished job is neat and trim, and it will last as long as the building.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL

WORLD'S LARGEST band saw and filer cutting 10-ton extrusion dies shown.

New Tool Stretches Taxpayer's Dollar

No question our modern military airplanes are worth their weight in gold to our security. Trouble is, the price tags look as if they really were made of the yellow metal.

Fortunately for the taxpayer, industry and the Air Force have been coming up with some cost-cutting tools to help turn out planes better, faster and cheaper. Gigantic new extrusion presses now squeeze out aluminum structural members up to 110 feet long—several times the length of those formerly produced. (Same principle as squeezing toothpaste out of a tube.) The long extrusions save a lot of time and money formerly consumed in joining shorter sections together. They're stronger and lighter, too.

To cut the 10-ton steel dies through which the aluminum is squeezed, The DoALL Company developed a giant sized band saw—see illustration. Weighing 8 tons and standing over 15 feet high, this machine is operated completely by remote control. The operator steers the work into the saw band, cutting out the required shape accurately to a layout line. Band machining is the only process possible for fast, low cost shaping of the dies. The material it removes as a solid piece represents a savings equal to the price of a Cadillac.

Here in operation is a practical lesson in the operation of our industrial economy. A machine tool builder voluntarily invested time and capital in a completely new and different "tool". The incentive was profit. The result was a benefit to the entire economy. The same principle creates our automobiles, radios, kitchen mixers and everything else.

110-FOOT aluminum extrusions reduce cost of military aircraft.

Reprints available for your employees.

DoALL band machines are manufactured in sizes and styles for every shop, large or small, for sawing, slicing, filing and grinding any material. Ask for band machining catalogs.

The DoALL Company

Des Plaines, Illinois

38 Local Sales-Service Stores

LETTERS

(Concluded from page 10)

series, "Motivating Men To Produce More" (Sept. 24, page 105).

We feel that this article is so well written and so pertinent that it should receive the attention of our management people and our industrial relations group. We would appreciate 35 copies.

J. W. Donahey
Manager, Public Relations & Advertising
Foote Mineral Co.
Philadelphia

Story Used to Advantage

Two copies of the interesting article, "Machining Aluminum on the Automatics" (Oct. 29, page 134) could be used to advantage in our engineering department.

Martin Krueger
Chief Engineer
Cutting Tools Division
Besly-Welles Corp.
South Beloit, Ill.

Timely Coverage of Problem

Please send five reprints of the article, "Wage Differential Maze: Where's Escape?" (Oct. 22, page 45). It is timely and typical of the problem we have faced for the last several years.

C. R. Dollinger
President
John Dollinger Jr. Inc.
Beaumont, Tex.

This is an interesting article. Please send a reprint.

H. Wolpman
Vice President
Grove Valve & Regulator Co.
Oakland, Calif.

I would appreciate a copy of this excellent article.

D. G. Wallace
Secretary-Treasurer
Standard Tube and T.I. Ltd.
London, Ontario
Canada

Selector Saves Planning Time

Your Metal Selector (insert in Oct. 1 issue) was recently called to our attention. Information contained in it is both valuable and easy to read. It will save us considerable time in our planning and designing.

We would appreciate 15 copies for distribution among our engineers.

R. E. Hirst
Chief Draftsman
New York Shipbuilding Corp.
Camden, N. J.

Company Reports Expansion

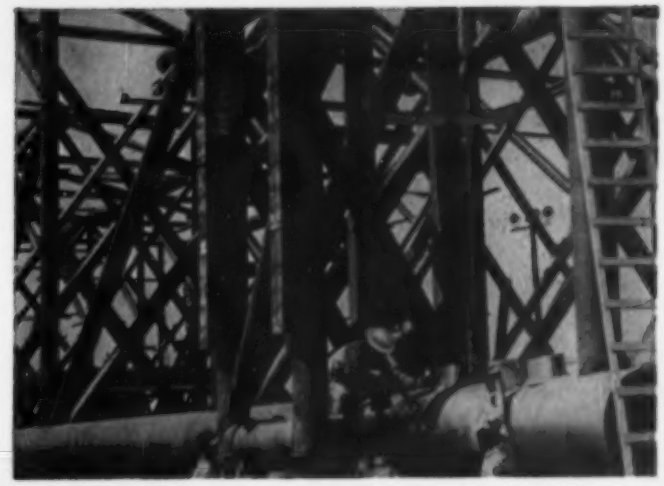
On page 93 of the Nov. 5 issue, you show a note concerning our company, stating that we have negotiated a $3.5 million loan to finance expansion of our Mercer Pipe Division.

The facts are that $3.5 million represents the cost of a new continuous weld pipe mill which is an addition to our pipe mill in our Mercer Division. However, we negotiated a $5 million loan to not only take care of expansion of the new mill but to take care of related expenses as well.

Ray F. Eisenbies
President
Sawhill Tubular Products Inc.
Sharon, Pa.

A...v...d...l...

specialist in Steel Fabrication



When you think of Avondale, it is only natural to think of steel . . . for Avondale has taken steel and used it to build their name and fame. Particularly noted for specialized steel fabrication, Avondale is world-famous for their pipe jackets, offshore rigs, steel ships and barges. Avondale's steel working equipment is far advanced—a new large capacity bending roll at the Main Yard is the latest addition to an already splendidly equipped facility. Next time . . . call Avondale.

SHIP BUILDING · SHIP REPAIRING · FOUNDERS · PROPELLERS · STRUCTURAL STEEL

STEEL

AVONDALE MARINE WAYS, INC. CABLE ADDRESS "AVONWAYS"

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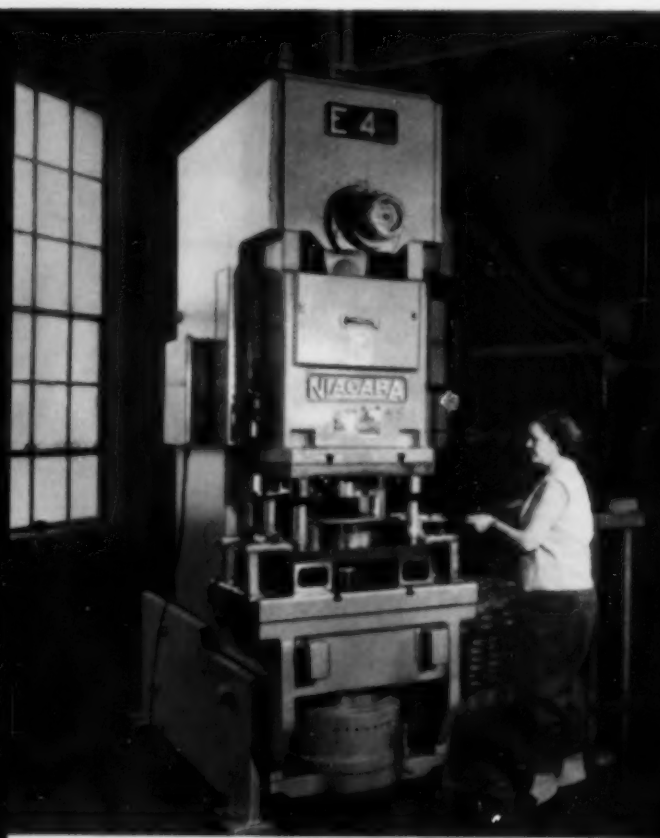
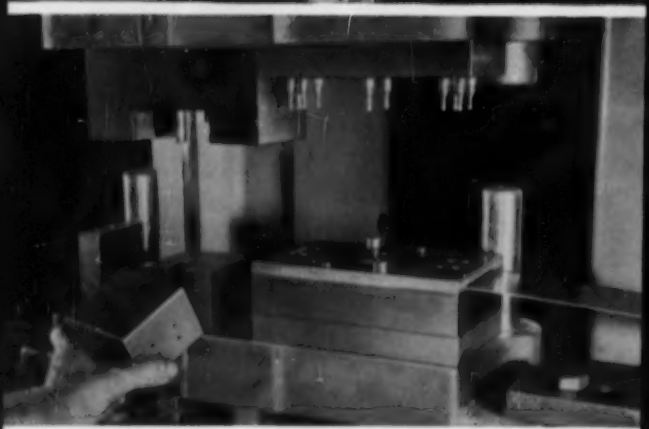
Take it from the early birds...

"IT'S THE GREATEST





Niagara Series E 4½ OBI Press in operation at a well known eastern commercial stamping plant. Work includes stamping small wrenches; trimming canopies for electrical fixtures; piercing, cutting off and forming saddles with a progressive die (shown).

Niagara Series E 4½ OBI Press engaged in blanking and drawing of kitchen cannister lids from half-hard aluminum at midwestern housewares manufacturing plant.

"we can produce from 8,000 to 10,000 pieces in an eight hour day"

"much safer press"

"takes less floor space"

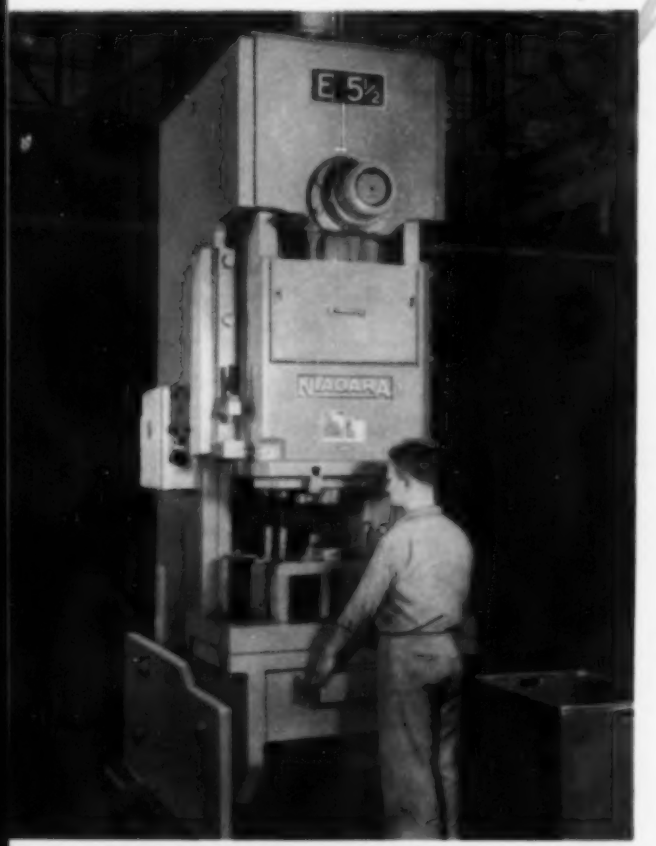
"has a centralized pressure lubricator which we like very much"

O.B.I. EVER BUILT"

"we find that dies without posts work much better on this press"

"all dies give better and longer runs"

"large slide area for large trimming, blanking and progressive dies"



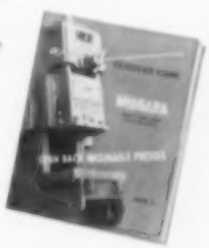
Niagara Series E 5½ OBI Press forming and trimming hemispherical copper parts for one of the "Big Two" electrical manufacturers.

Few developments in metalworking history have drawn the enthusiastic endorsement given Niagara's revolutionary Front-to-Back Crankshaft OBI Press.

Now, as at the 1955 Machine Tool Show where it was unveiled, there is *nothing* even remotely resembling it in the industry...design-wise and production-wise.

Customers in U.S. and Canada...the "early birds" who are doing their modernizing with the most modern press of all...can today tell you about accomplishments with this newest and greatest of OBIs that you would have never dreamed possible. Yes, the press that Niagara conceived to do more than any OBI ever built is doing just that for a fast-growing list of metalworking plants.

There's a huge fund of successful experiences that a Niagara representative can share with you today. Draw on it now and utilize it in your modernization plans. Make a date, at your convenience, for a personal call.



...and if you haven't received new Bulletin 56 with complete design description and specifications (75-200 ton capacities, 4½-7½ inch shaft diameters, standard and automated models) write for your copy at once. You will find it invaluable to your planning.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

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Distributors in principal U. S. cities and major foreign countries

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America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

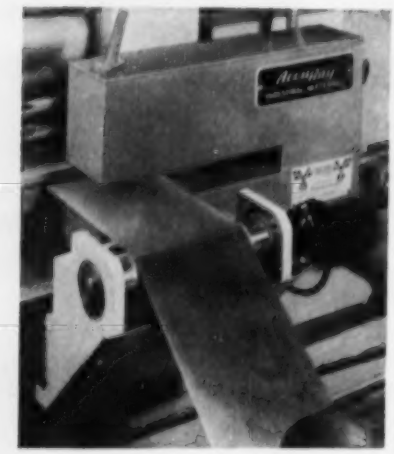
NIAGARA

front-to-back crankshaft INCLINABLE PRESSES

MONEL • NICKEL • COPPER • ALLOYS

THIN STRIP

UNIFORM
AS THE ATOM



Somers Thin Strip now Gauged by Nuclear Energy

To meet the increasing demands of electronics and other industries for *uniform* closer tolerances, Somers Brass has taken advantage of one of the latest developments in the electronic field by installing the first Accu-Ray gauges in the non-ferrous industry. These units make it possible to check and control thickness from edge to edge throughout each coil to a degree of accuracy never before known.

Accu-Ray gauging is typical of the modern methods Somers combines with engineering experience to provide thin strip metal to your most rigid specifications. Nickel, Monel, and Nickel Alloys from .020" to .00075". Brass, Bronze, Copper and Alloys from .010" to .00075".

FOR EXACTING STANDARDS ONLY

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104 BALDWIN AVE., WATERBURY, CONN.

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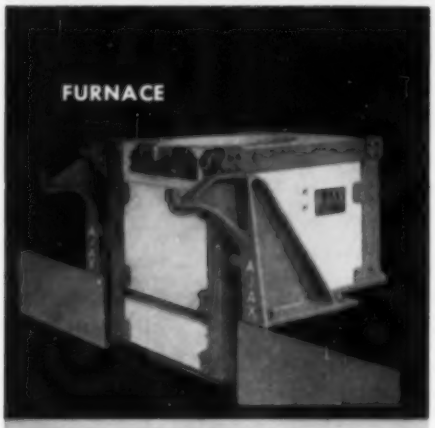
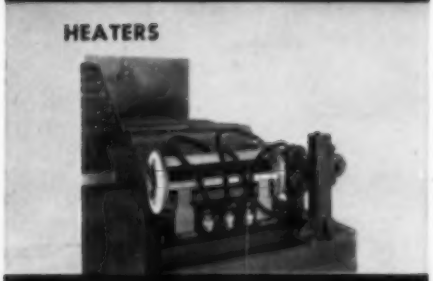
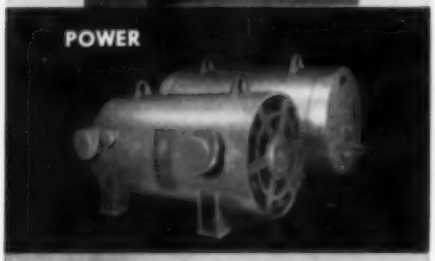
AJAX...for complete induction heating-melting systems







Behind every induction furnace there must also be a source of power and a means of controlling that power. While the characteristics of any one of these three elements limits the selection of the other two, there are no hard and fast rules to follow when designing a complete system. Only experienced specialists can effect the perfect match which alone assures you all the advantages induction methods can provide.

You can get some idea of the breadth of choice which exists when planning a system from the general descriptions below. For further details, write Ajax Electrothermic Corporation, Trenton 5, New Jersey.

FURNACE

Tilting Type: Usually chosen for ferrous metals and larger charges of non-ferrous metals. Close coupling between coil and charge makes for high efficiency. Double trunnion keeps spout close to mold.

Lift-Coil Type: For non-ferrous metals in charges to 300 lbs. Inductor coil lowered over charged crucible, raised after charge melts, lowered over second crucible. Highly flexible.

Vacuum and Pressure Type: Wherever exceptionally high purity is required. Custom designed for charges from a few pounds to over 1000 lbs. (steel).

Special Types: AJAX has often drawn on its long experience to design and construct numerous furnaces and crucibles of special sizes and shapes and materials.

HEATERS

General Purpose: Inductors can be designed for any induction heating job. Inexpensive heaters can easily be interchanged for various load sizes and shapes. Special inductors are available to focus heat for forging, brazing, hardening, soldering, etc.

Carbides: These special furnaces for making and hot-working carbides are usually equipped with graphite crucibles or sleeves, able to withstand very high temperatures. Units are available for hot-pressing carbides in vertical or horizontal presses.

POWER

Motor Generators: Used for most large production heating and melting jobs. Available at frequencies from 1 to 10 kc, with output from 30 to 1250 kw and up.

High Frequency Converters: Spark gap converters used in laboratories and for small production jobs. Self-tuning. Frequency range from 12 to 60 kc, at power ratings of 6, 20, and 40 kw.

CONTROLS

All controls for an AJAX installation are grouped in one convenient location. Complete instrumentation permits even a relatively unskilled operator to keep the furnace at top efficiency. The panel shown controls a motor generator set. Converter controls are generally more simple, and are mounted on the converter cabinet.

Associated Companies: **Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.**

AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

The unique air-blast test device shown above makes possible one of the most accurate accelerated spalling tests in the basic refractories industry.

Following is an example of how Kaiser Chemicals research laboratories use the test to help develop Periclase Chrome brick with stronger bonds, lower thermal expansion and higher conductivity (the three "musts" for spall-resistant brick):

"Whistling Wind" Creates Heat Differential

First, 3″ x 3″ x 6″ samples of pre-fired brick are placed in a furnace and brought up to test temperature.

Next, the samples are removed from the furnace and placed immediately in the test device. Unheated insulating brick cover all sides and the bottom of each hot sample, leaving only one 3″ x 3″ end of each brick exposed.

Then, high-pressure jets of cold air are blown directly onto the exposed ends of the glowing bricks. This "Whistling Wind" air blast shock-chills one end of each brick . . . while the rest of the brick remains red-hot!

Tests Brick's Ability to Resist Spalling

After a measured air-blast cooling period, the bricks are inspected and cracks (if any) recorded. The bricks are then placed in the furnace again to repeat the cycle. A record is kept for each test cycle, and failure is recorded when a brick separates.

Research Lengthens Brick Service Life

This unusual test is just one example of the thoroughness and originality of Kaiser Chemicals Research. From it—and from many other unique tests—come special refractory compositions such as Kaiser Periclase Chrome brick that assure open hearth operators of less spalling, less swelling and greater resistance to alteration by oxides and slags. Good reasons why more and more open hearth operators say:

"Kaiser Periclase Chrome Brick Last Longer"

For this unique spall test, "Whistling Wind" chill-blasts one end of each brick while the rest of the brick remains red-hot.

MORE REASONS WHY KAISER PERICLASE CHROME BRICK GIVES YOU BETTER SERVICE:

1. **Low Chromite Content.** Chromite content is the minimum amount necessary to provide thermal shock resistance, (only 9.1% Cr_2O_3). Lowering of chromite also reduces swelling in presence of iron oxide, thus minimizes buckling and peeling.

2. **Uniform High Strength** because the ceramic bond is formed *BEFORE* the chemical bond burns out.

3. **Outstanding Dimensional Stability** because there is no liquid phase in the conversion from chemical to ceramic bond. Nothing "melts out" to cause distortion or shrinkage.

4. **Excellent Resistance to Chemical Attack** by furnace fumes, iron oxides and slags is assured by high magnesium oxide content, maximum brick density, (low porosity), and chemically stable composition.

Call or write Kaiser Chemicals Division, Dept. S6231, KAISER ALUMINUM & CHEMICAL SALES, INC., at any of the addresses listed below.

PITTSBURGH 22, PA. . . . . 3 Gateway Center
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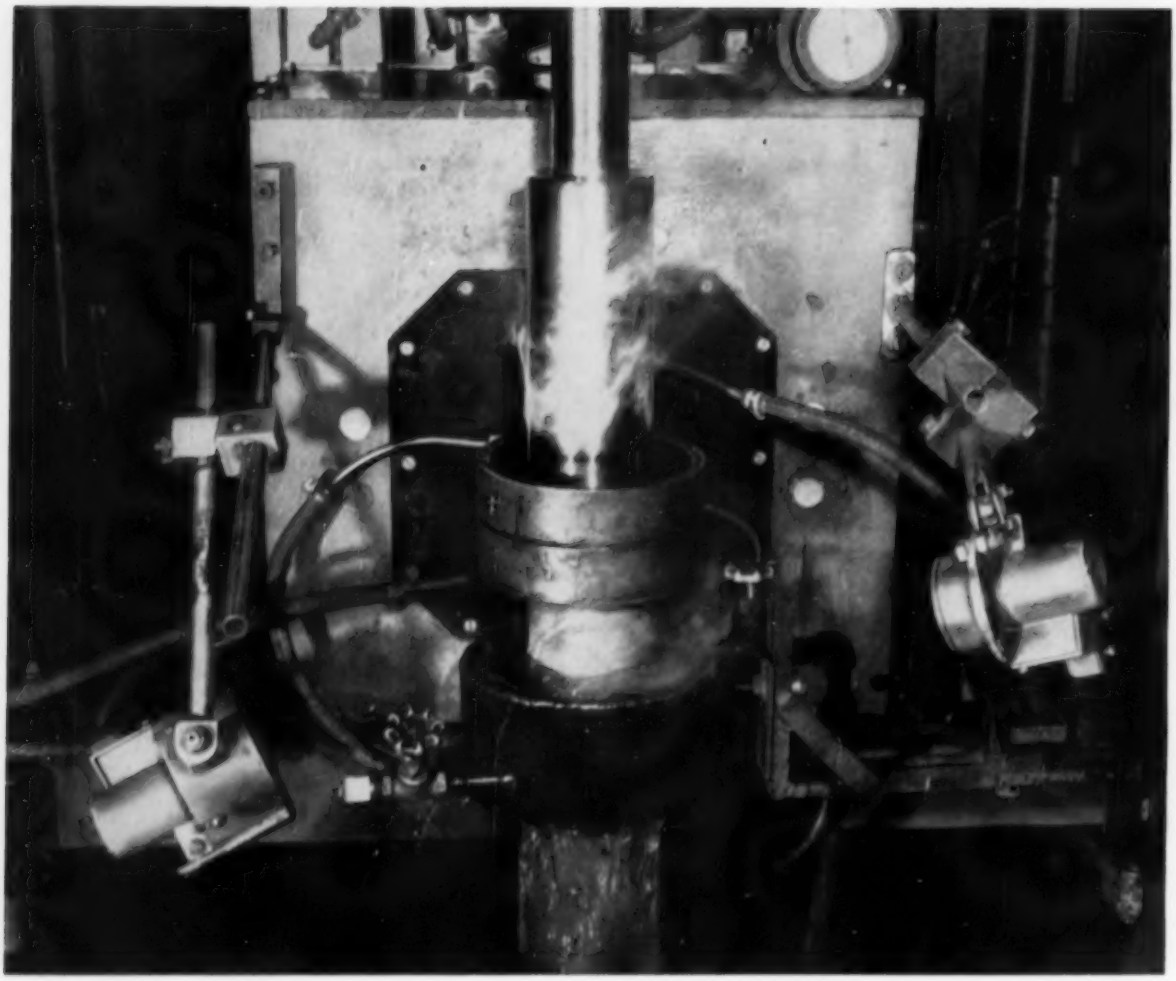
Pioneers in Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS
MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS



Soaking up heat radiation...

. . . these two L&N Rayotube® detectors are helping McKay Machine Company induction-harden bodies of leveller rolls. About four years ago, this manufacturer of sheet, tin and strip mill equipment switched to full time induction hardening of these shafts which range from 7/8" to 12" in diameter and up to 12' long. The new method doubled production . . . eliminated warpage . . . and provided scale-free hardening. And, in addition, the use of L&N temperature control enabled the McKay Machine Co. to reduce setup time . . . eliminate trial runs . . . and produce the same results heat after heat.

The temperature regulating equipment consists of Speedomax®-Rayotube control on each of two 3000-cycle induction generators having a maximum capacity of 400 kw. One Speedomax in combination with a Rayotube detector controls work temperature by operating a motor-operated rheostat to regulate power input to the induction coil. For quality control, a second Speedomax-Rayotube combination measures and records quench temperature while a third Speedomax provides a record of work speed through the coil.

To find out how L&N temperature control may help increase the efficiency of your induction heating, contact your nearest L&N sales office or write 4957 Stenton Ave., Phila. 44, Pa.

LEEDS Instruments LN NORTHRUP Automatic Controls • Furnaces

FELLOWS EQUIPMENT FOR FINE-PITCH GEARS

cuts production time up to 50% at *ALLING-LANDER!*

1 Gears for a major instrument maker: Fellows 3" Fine-Pitch Gear Shaper turns them out at one-third previous cost, more than twice as fast: 120 finished gears per hour, compared to old rate of 55.

2. For extra precision: Fellows No. 4 Fine-Pitch Gear Shaving Machine makes good gears better with finer finish, minimum backlash, tighter tolerances where desired.

3. Proof: Fellows No. 4 Fine-Pitch Red Liner Inspection Instrument makes a permanent, graphic record of gear quality . . . quick, efficient and accurate.

Well known for their excellent service in producing instrument type gears of close tolerance, the Alling-Lander Company, Inc. of Sodus, New York has cut gear production time up to 50%, and unit costs more than half, by using the latest Fellows equipment in their fine-pitch gear department.

Fellows Precision Line also includes other types of gear inspection instruments and a number of models of Gear Shapers for cutting spur and helical gears of larger sizes. Your Fellows representative can give you information about any of them. Write, wire or phone any of our offices.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices: 1048 No. Woodward Ave., Royal Oak, Mich.
5835 West North Avenue, Chicago 39
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6214 West Manchester Avenue, Los Angeles 45

THE PRECISION LINE

Fellows *Gear Production Equipment*

CINCINNATI RIGID SHAPERS

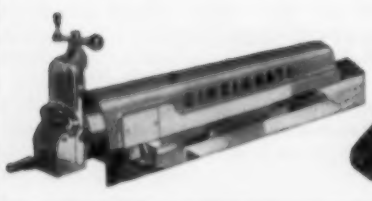
New—modern—these Rigid Shapers offer faster, more convenient controls, greater accuracy, greater dependability. The New nodular iron ram and vise body, and wide heavily ribbed column give a new rigidity—increase accuracy in cutting.

The New slot-free ram also eliminates the manual clamping of ram adjustment—a time saving feature.

A speedy, dependable electro-magnetic brake and clutch insure a faster performance.

50 P.S.I. pressure lubrication, exclusive on Cincinnati Shapers, is a real insurance against wear and a guarantee of long trouble-free performance.

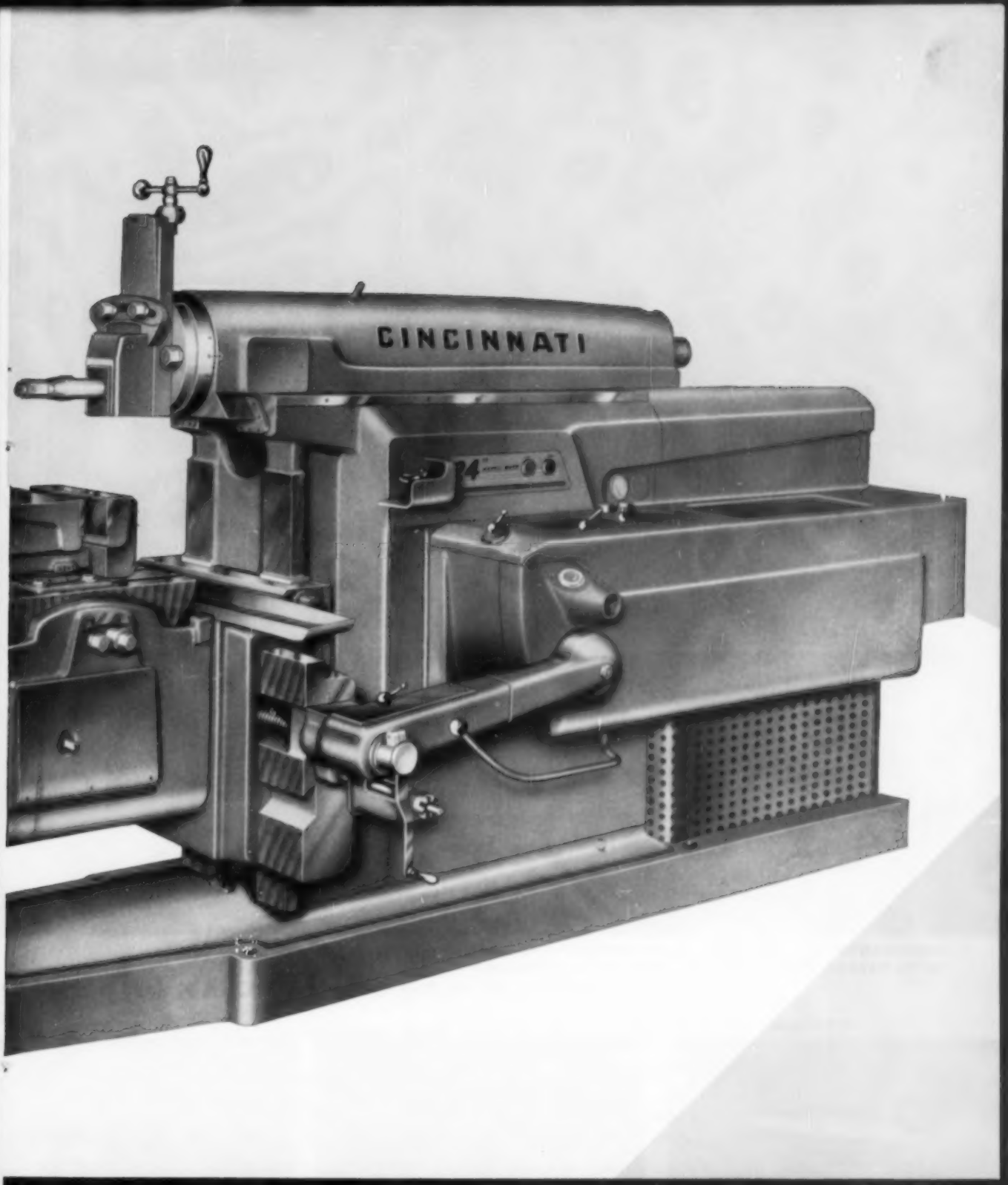
Write for the circular on the New Rigid Shapers.



Nodular iron, slot-free ram

Electro-magnetic Clutch and Brake

The only shaper with 50 P.S.I. lubrication

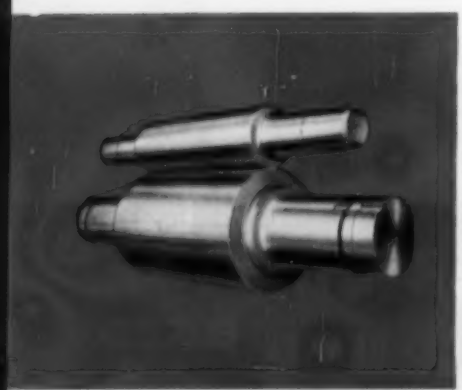


THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

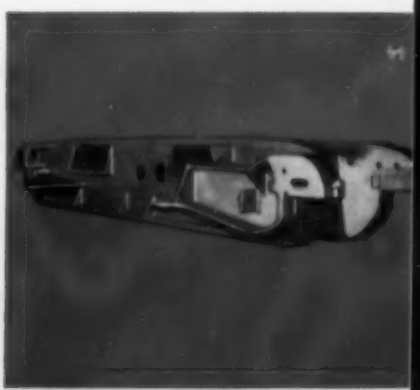
CINCINNATI

CONTINENTAL 28" x 49" x 66", 4-high reversing hot strip mill in the Newport Steel Corporation Plant, Newport, Kentucky.

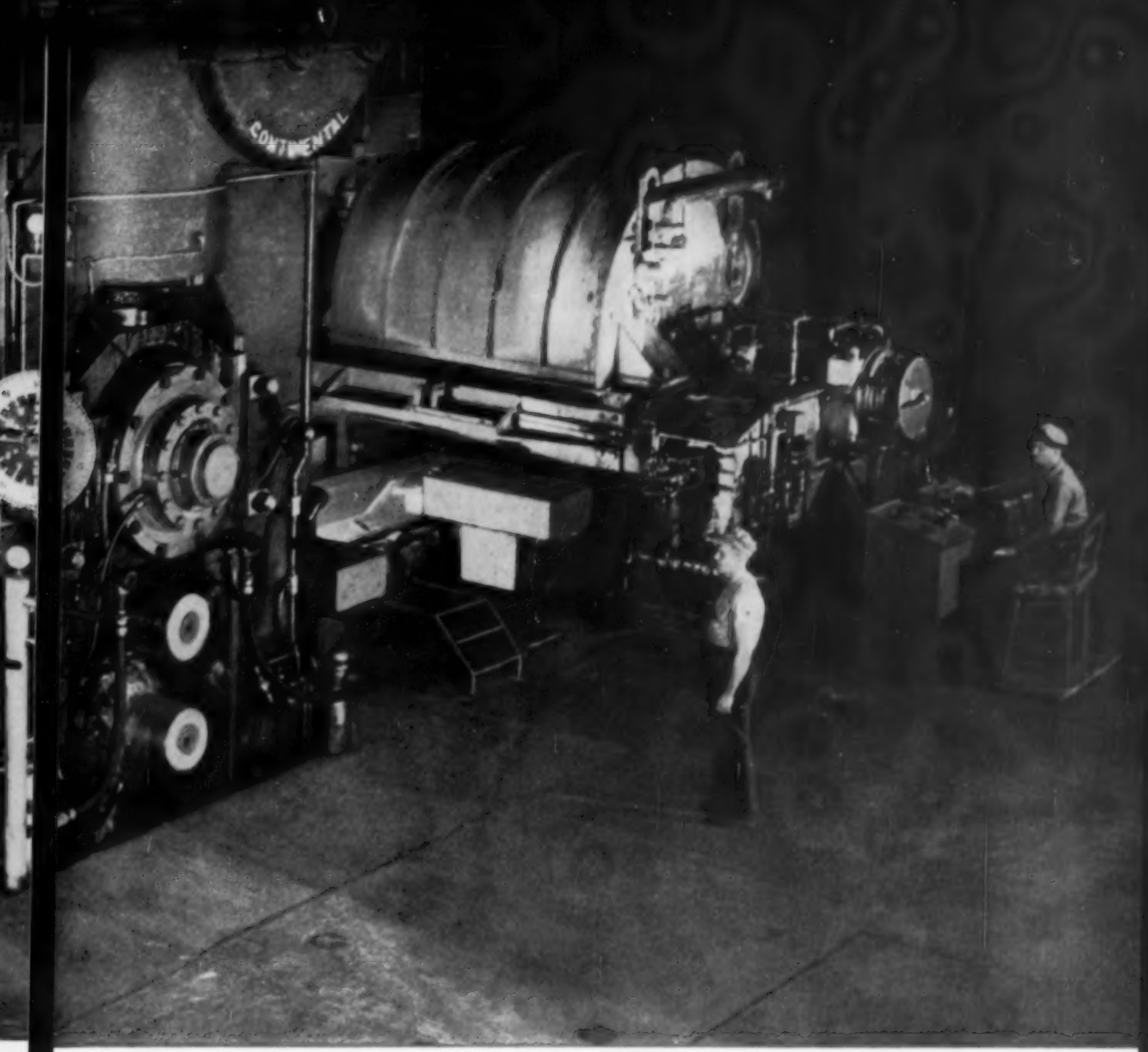


ROLLS—iron, alloy iron and steel rolls for all types of rolling mills.

CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.



WELDMENTS—fabricated steel plate, or cast-weld design.



BLAW-KNOX *makes what it takes*

to roll precision-gage hot strip directly from ingots

Precision-gage hot strip is rolled directly from ingots by this modern CONTINENTAL 66-inch 4-high reversing hot strip mill in the Newport Steel Plant at Newport, Kentucky.

A full range of gages and analyses, including carbon and special grades of steel, are rolled by this 26″ x 49″ x 66″ mill. The mill was designed to incorporate an existing 4000 hp. d.c. reversing motor through a pinion stand.

Blaw-Knox designs and builds *complete* rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • roll mills • billet mills • rod mills • merchant mills • roll lathes • chippers • special machinery • and complete auxiliary equipment.

50th Anniversary
BLAW-KNOX
1906-1956

CONTINENTAL

Only P&H AC/DC Welders give you

7 Welders in 1

. . . you get AC or DC at the flip of a switch—
plus quick, exact heat from Dial-lectric Control

One P&H AC/DC Welder now does the work of seven separate welding machines. This versatile 1 for 7 P&H machine reduces your capital investment—saves time and money — gives you better welds. The P&H AC/DC Welder also has Dial-lectric control for instant heat adjustment through the entire range.

Because of its flexibility, the P&H AC/DC Welder opens many new welding opportunities for large and small plants. It's so easy to use that even new men make good welds on "difficult" metals. There's a right size P&H AC/DC Welder for most needs. Capacities range from 7 amps to 675 amps. Write today for more information.

HARNISCHFEGER
MILWAUKEE 46, WISCONSIN

I'M SMOOTH-ARC SCOTTY...
and I'm tellin' you seven ways you can use the P&H AC/DC Welder. Take any one of the seven, and it beats anything you've ever used. Send in the coupon for complete information... free!

1 Heliarc* DC Straight or Reverse
2 Heliarc* AC
3 Automatic Heliarc*
4 Sigma Welding Unit
5 Metallic Arc DC Straight or Reverse
6 Metallic Arc AC
7 Spot Welding AC or DC
P&H
*Trademark of

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Welding Division
4411 W. National Avenue, Milwaukee 46, Wis.
Attention: W. R. Stephens, Sales Manager
I'd like to see more information on P&H AC/DC Welders. Please send it to me.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____
3008

the P&H *Line*

P&H welding equipment is manufactured and sold in Canada by REGENT EQUIPMENT MANUFACTURING COMPANY LTD., 455 King Street West • Toronto, Ontario, Canada

CALENDAR
OF MEETINGS

Nov. 26-27, Wire Reinforcement Institute Inc.: Fall meeting, Jung hotel, New Orleans. Institute's address: National Press Bldg., Washington 4, D.C. Managing director: Franz B. Brown.

Nov. 26-30, American Society of Mechanical Engineers: 22nd National Exposition of Power & Mechanical Engineering, Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N.Y. Exposition manager: E. K. Stevens.

Nov. 26-30, National Institute of Management Inc.: Production control and inventory management program, Alcazar hotel, Cleveland Heights, O. Institute's address: 1008 National City Bank Bldg., Cleveland 14, O. Managing director: Nyles V. Reinfeld.

Nov. 27-30, National Chemical Exposition, Public Auditorium, Cleveland. Information: American Chemical Society, Chicago Section, 86 E. Randolph St., Chicago 1, Ill.

Nov. 28-30, National Industrial Conference Board Inc.: Atomic energy conference, Waldorf-Astoria, New York. Board's address: 460 Park Ave., New York 22, N.Y. Secretary: Herbert S. Briggs.

Dec. 3-6, National Institute of Management Inc.: Program on work simplification for supervisors, Alcazar hotel, Cleveland Heights, O. Institute's address: 1008 National City Bank Bldg., Cleveland 14, O. Managing director: Nyles V. Reinfeld.

Dec. 5-6, Aluminum Extruders Council: Annual meeting, Park Sheraton hotel, New York. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Lemelman.

Dec. 5-7, National Association of Manufacturers: Annual meeting and exhibit, Waldorf-Astoria, New York. Association's address: 2 E. 48th St., New York 17, N.Y. Secretary: Thomas M. Brennan.

Dec. 5-7, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.: Electric furnace steel conference, Morrison hotel, Chicago. Institute's address: 29 W. 39th St., New York 18, N.Y. Secretary: Ernest Kirkendall.

Dec. 6-7, Illinois Institute of Technology: Cost control conference, IIT Commons Bldg., 3200 S. Wabash Ave., Chicago. Institute's address: 35 W. 33rd St., Chicago 16, Ill. Manager of public relations: Victor J. Danilov.

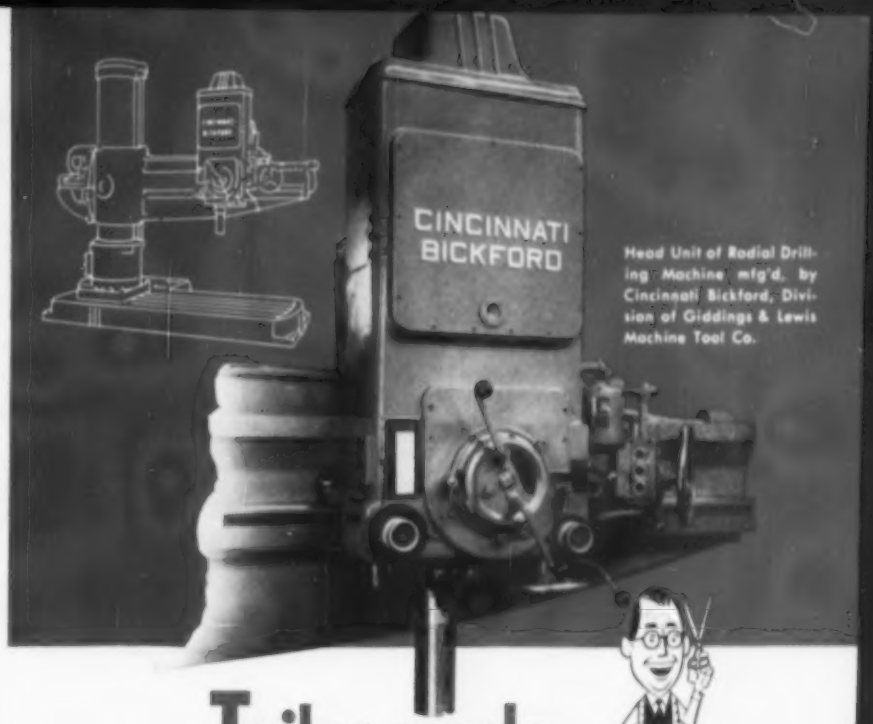
Dec. 9-12, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, Boston. Institute's address: 120 E. 41st St., New York 17, N.Y. Secretary: F. J. Van Antwerpen.

Dec. 10-11, Material Handling Institute Inc.: Annual meeting, Biltmore hotel, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

1957

Jan. 14-18, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler hotels, Detroit. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: John A. C. Warner.

Jan. 18, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.



Head Unit of Radial Drilling Machine mfg'd. by Cincinnati Bickford, Division of Giddings & Lewis Machine Tool Co.

Tailor-made CASTINGS*

65 in Cincinnati Bickford Head Unit

Producing castings for today's precision machine tools demands the ultimate in technical skill. That's why machine tool manufacturers, such as Cincinnati Bickford, specify castings "tailor-made" by Hamilton Foundry. They know it pays to take advantage of Hamilton Foundry's well-earned reputation for "tailoring" castings to do the jobs they were designed to do!

At Hamilton Foundry, you'll find the most rigid adherence to the design engineer's specifications plus a wide variety of irons that meet physical properties required by service conditions. And you can stop worrying about intricate designs . . . tight dimensional tolerances . . . and wide range of metal sections.

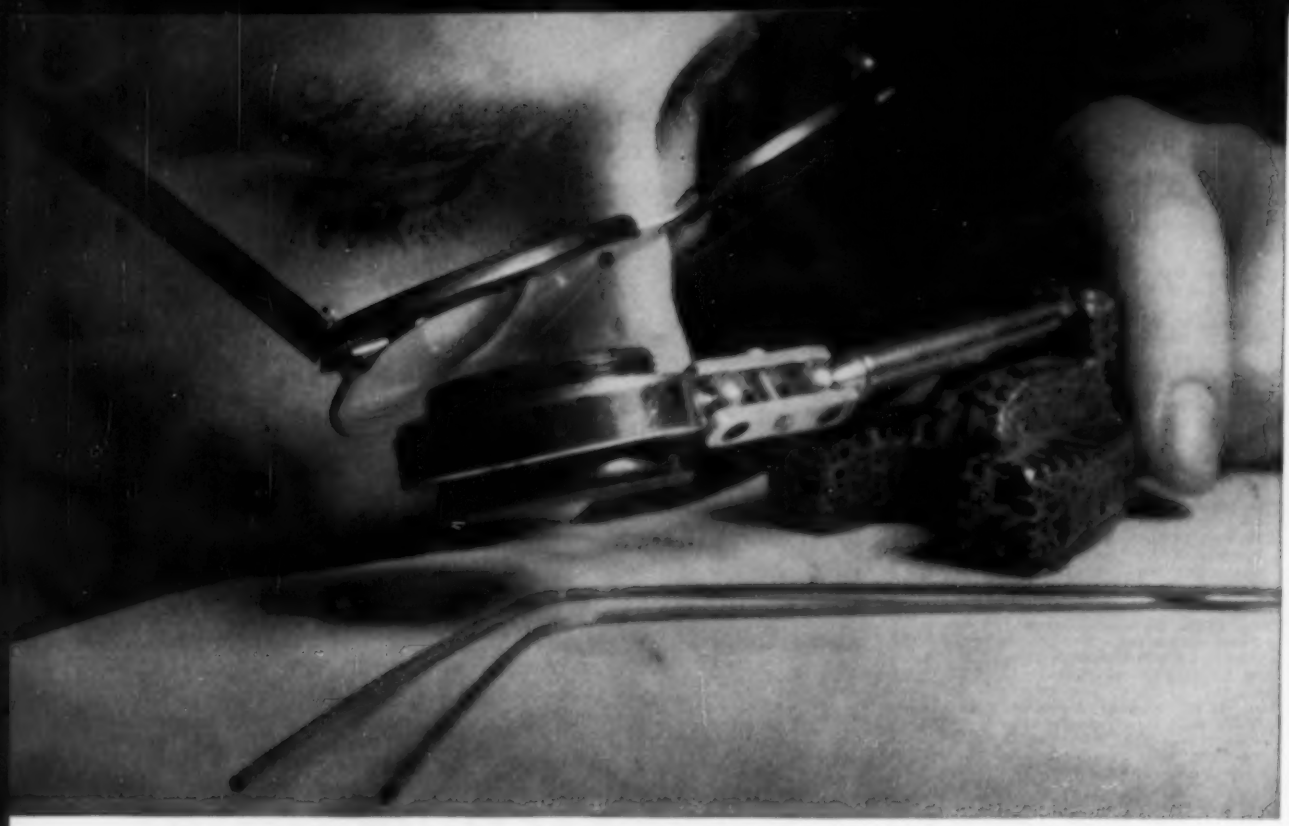
* P.S. Above photo shows the Head Unit of Cincinnati Bickford's 7 foot, 19" column, Super Service Radial Drilling Machine, featuring complete hydraulic pre-selection of all 36 speeds and 18 feeds. This Head Unit contains a total of 65 "tailor-made" HAMILTON QUALITY CASTINGS® with a weight range of 0.3 lbs. to 804 lbs.

Call on Hamilton Foundry for "tailor-made" castings.

GRAY IRON • ALLOYED IRON
MEEHANITE • NI-RESIST • NI-HARD

THE HAMILTON FOUNDRY
AND MACHINE CO.
1551 Lincoln Avenue • Hamilton, Ohio
Phone TWinbrook 5-7491

H56-4



The Connecticut Spring Corp. imposes rigid standards which Johnson Steel & Wire Co.'s Music Wire meets.

They Use Electronics To Build Steel Springs

Connecticut Spring Corporation Uses Johnson Music Wire To Do "The Impossible"

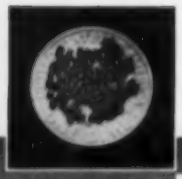


Photo shows 97 springs on a dime with plenty of room to spare, illustrates why The Connecticut Spring Corp. has introduced electronics into production.

What was long considered impossible in the intricate manufacture of precision steel springs—use of electronic production controls—is being done daily in the Hartford plant of The Connecticut Spring Corporation.

Electronics are being used in production of one spring so small that 100 of them fit on a dime easily.

Electronic devices are doing several production jobs for The Connecticut Spring Corp. to protect the company's reputation for quality.

But electronics, as company officials will quickly tell you, only measure quality, not create it.

Quality in a steel spring starts with the wire. That's why Connecticut Spring, one of the largest specialty fine wire users in the East, has been a Johnson Steel & Wire Co. customer since starting business 20 years ago.

"Our experience with Johnson wire has been satisfactory in every respect," says John A. Torda, general sales manager.

Electronic scanning of springs too

(Advertisement)

John Torda, sales manager, left, checks drawings to see that spring being wound meets specifications.

Numerous quality tests are performed on the aircraft spring to insure that it can perform its vital function in plane's fuel system.

Pittsburgh Steel's hard-drawn MB wire is used by Connecticut Spring for cellar door counter balance door spring. Here wire gets two bends.

Three coils are wound into each side of spring. Pittsburgh Steel has been major supplier for this product since production started.

Ready for installation. Tensile strength of wire (Pittsburgh's .218) is vital. Connecticut Spring has no complaints on wire quality.

small to be measured manually is just one precaution the company takes. Its toughest job—a precision compression spring for the carburization system of a reciprocating aircraft engine—illustrates the firm's exacting emphasis on quality.

This aircraft spring weighs only half an ounce but controls the fuel flow in the engine.

The spring is tapered from a top O.D. of 1 inch to a bottom $\frac{5}{8}$ inch O.D. Free length is $1\frac{1}{2}$ inches with $8\frac{1}{2}$ coils. Made to Aircraft Material Specification 5112, the spring uses Johnson's .090 Music Wire.

Johnson conducts its own rigid inspection before shipping from its Worcester, Mass., mill to certify the wire meets AMS demands.

Connecticut Spring could get by on this certification. Instead, it conducts its own complete test of physical properties and then trial runs a sample piece of wire from each lot. During production, it runs several inspections, including two load value tests on five different check points.

The aircraft spring goes through heat treating and brazing operations. It must meet precise load specifications, thus its tensile strength must be exact. Specifications permit only one degree of squareness. Load values have a plus or minus tolerance as limited as .003 to .008. A battery of testing devices makes certain these specifications are met or surpassed.

Connecticut buys every size range of Johnson's Music Wire, starting at .003 and going to .300.

For its complete product line, Connecticut relies on both Johnson and its parent Pittsburgh Steel Company. The wire mills of Pittsburgh Steel have become major supplier of hard-drawn MB wire used to make double counter-balance springs for steel cellar doors. Pittsburgh also supplies oil-tempered MB wire for transformer base mounting springs.

Whatever the wire application, Johnson Steel & Wire Company and Pittsburgh Steel Company can serve you. From aircraft cord wire to tire bead wire made by Johnson through oil-tempered, hard-drawn, low-carbon or core wire from Pittsburgh Steel, the team of wire specialists stands ready to serve you. Call in a wire specialist from Johnson or Pittsburgh today for a talk about your wire problems.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

***a subsidiary of* Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

(Advertisement)

60 second tour

shows it in a nutshell . . .

All-Inclusive Spring Service

COMPRESSION SPRINGS
Regular, Double

COMPRESSION SPRINGS
Special Shapes
Variable pitch

VOLUTE SPRINGS
Coned end

EXTENSION SPRINGS
Special Hooks
and Loops

EXTENSION SPRINGS
Swivel End
Drawbar

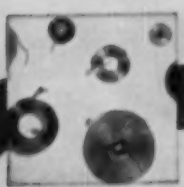
TORSION SPRINGS
Single, double
Edge wound

POWER SPRINGS
Clock or Motor

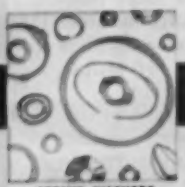
FLAT SPRINGS
Arched, Curved-beam
Elliptical

CLIPS, CLAMPS
and COLLARS

FASTENERS and
RETAINERS



HAIRSPRINGS
for Instruments
Gauges, etc.



SPRING WASHERS
Wavy, Star, Finger,
Expander, etc.

BELLEVILLE SPRINGS
In Series, Parallel
Parallel-series

DIAPHRAGMS
Discs, Plates

PLUS
COLD-ROLLED
SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT

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RAYMOND Manufacturing COMPANY
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DIVISIONS OF ASSOCIATED SPRING CORPORATION
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DUNBAR BROTHERS COMPANY
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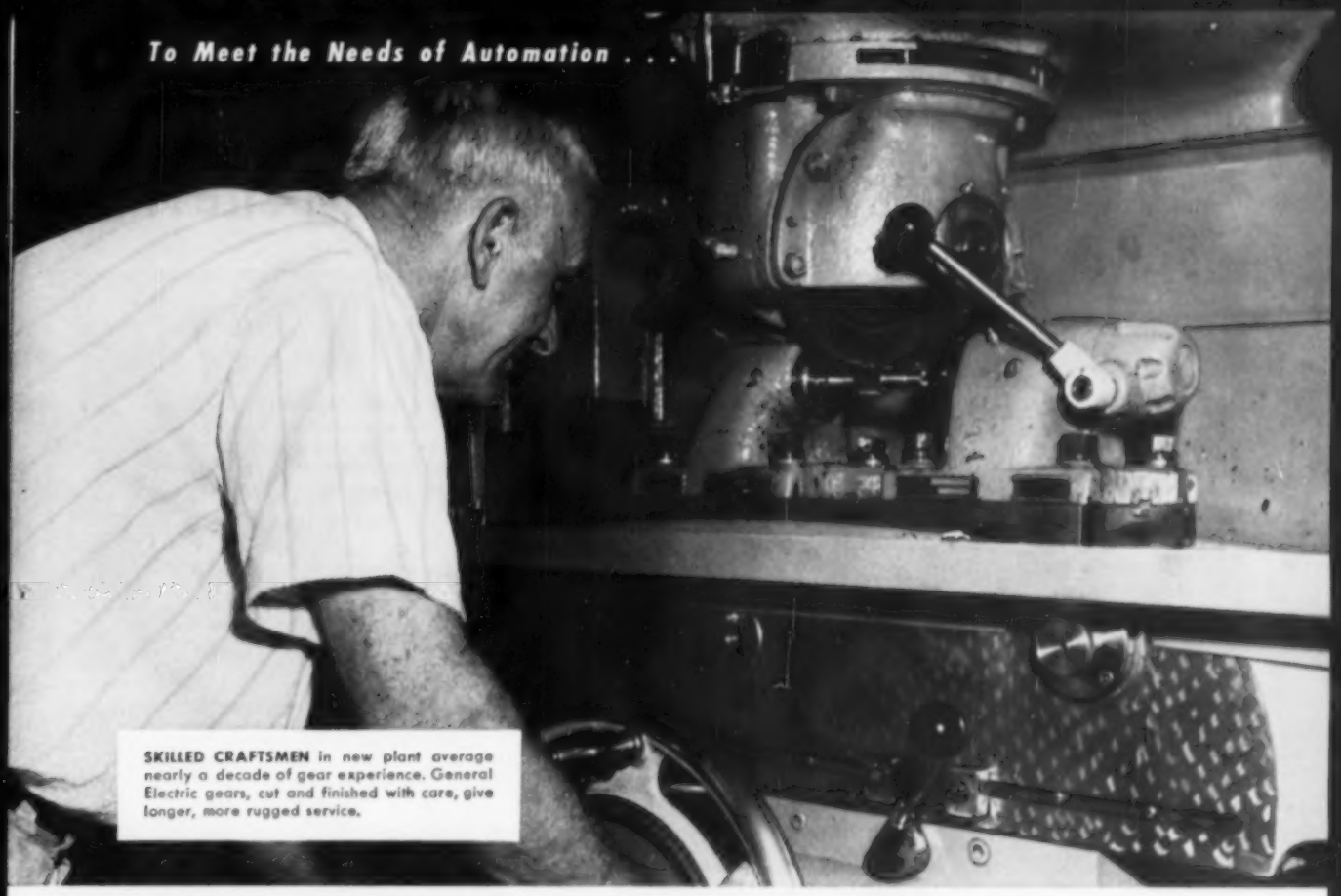
F. N. MANROSS AND SONS CO.
BRISTOL
CONNECTICUT

THE WALLACE BARNES CO., LTD.
HAMILTON
CANADA

Divisions of

ASSOCIATED SPRING CORPORATION

To Meet the Needs of Automation . . .



SKILLED CRAFTSMEN in new plant average nearly a decade of gear experience. General Electric gears, cut and finished with care, give longer, more rugged service.

At General Electric's NEW Gear Motor and Transmission Components Department . . .

3618 man-years of manufacturing know-how assure fast service on low-speed drives

To meet the increased demand for low-speed drives, General Electric's new decentralized Gear Motor and Transmission Components Department will be devoted solely to the design and manufacture of mechanical power transmissions.

•Specialized Attention—Highly trained and experienced gear-motor engineers and skilled craftsmen with over 3600 man-years of experience are available to help solve your low-speed drive problems. They are ready to give you fast, dependable G-E service on standards, on specials, and on new gear-motor products.

•Complete Line Available—General Electric offers a complete line of gear-motors—induction, synchronous, wound rotor, d-c gear-motors—in all types and enclosures, from 1/100 to 200 hp. The new department will also give you rapid service on special needs such as adjustable speed, braking, special mounting or special insulation.

•Fast Service—The expanded gear-motor facilities allow quantity production and shorter manufacturing cycles. Machine tools in the new factory are designed for high volume precision work and are readily adaptable for the production of specials built to your specifications.

•For More Information—Write for bulletin GEA-6027, Section 851-2, Schenectady, N. Y., or contact your G-E Apparatus Sales Office or gear-motor supplier. Gear Motor and Transmission Components Department, General Electric Co., Paterson, N. J.

Progress Is Our Most Important Product

GENERAL ELECTRIC

CONTINUOUS TESTING provides data for quality control, new designs and developments. Here, an involute measuring instrument records wear, under simulated tortuous conditions, to nearest ten-thousandths of an inch.

QUANTITY PRODUCTION of complete line of G-E gear-motors from 1/100 to 200 hp, in all types and enclosures, assures prompt customer service. Specify General Electric for all your low-speed drive needs.

By building this blast furnace off-site...

GRANITE CITY STEEL COMPANY'S new blast furnace. It has a hearth diameter of 25 feet (expandable to 26 feet, 6 inches) and a capacity of approximately 1,200 net tons of iron a day, twice that of the furnace it replaces.

Koppers cuts downtime for Granite City Steel

When Granite City Steel Company, Granite City, Illinois, decided to replace Blast Furnace "A" with a much larger furnace, there was *more than the usual concern* over downtime. Only the adjacent furnace was available to supply hot metal for the company's seven open hearths during this period of shutdown.

PHOTO SHOWS FURNACE BEING MOVED. Shell and superstructure of new blast furnace weigh 635 tons—are as high as a 15-story office building. Furnace was built off-site, then moved 84 feet. It was lowered into final position by eighteen 100-ton jacks.

To keep loss of pig-iron production to a minimum, the Freyn Department of Koppers Engineering and Construction Division used the off-site method of construction—a method rarely used in the history of American steelmaking.

While old furnace "A" was still producing iron, the shell of the new furnace was built some distance away. The old furnace was then blown out and dismantled; the foundation was rebuilt and the hearth and columns for the new furnace were constructed in place. Then, the new shell and superstructure, weighing 635 tons, were moved 84 feet and lowered onto the columns.

According to officials of Granite City Steel, this off-site method of construction saved between 30 and 40 days' downtime. The new Koppers furnace is now in operation, and already operating at about 90 per cent of rating.

During the brief shutdown period while work on the stack was in progress, an additional 1,650 tons of steel were erected in the form of three stoves, a dustcatcher, gas washer, precipitator, and interconnecting mains. The skip pit was extensively revised to accommodate larger skip tubs. A new hoist house and complete charging facilities were also part of this well-timed job.

The new Koppers furnace is an important step in reaching Granite City's goal of over 30 per cent increase in annual ingot capacity.

Designing and constructing blast furnaces is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers. You are invited to consult with our Engineers and Management.

FREYN DEPT., KOPPERS COMPANY, INC.
PITTSBURGH 19, PENNSYLVANIA

KOPPERS

KOPPERS

ENGINEERING AND CONSTRUCTION

GRANITE CITY STEEL COMPANY...

"Keeps Rollin' Along"

And Allis-Chalmers steel mill equipment is helping in a new expansion program designed to increase steel production in mid-America

ALONG the banks of the mighty Mississippi, near the geographical center of mid-America, new steel-making facilities are being planned. Granite City Steel Company is planning another major expansion program which will raise their ingot production 30% by early 1958.

Just two years ago, Granite City Steel completed an $89,000,000 expansion. It was the culmination of a 7-year program, in which Allis-Chalmers supplied all major electrical requirements, bringing this midwestern plant up to maximum efficiency.

In this new modernization, Allis-Chalmers steel mill equipment will again play an important role. So far, Granite City has called on Allis-Chalmers for all the necessary electrical equipment needed to revamp their cold-strip mill, and the single-stand temper mill, plus other auxiliary machines.

Allis-Chalmers specializes in mill modernization and expansion. For specific information on drives, control and other electrical equipment for steel mills, contact your A-C representative, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Other Allis-Chalmers Products for the Steel Industry

Centrifugal Blowers • Axial Blowers • Arc-Furnace Transformers • Mercury-Arc Rectifiers • Rotary Compressors
Unit Substations • Switchgear • Circuit Breakers • Voltage Regulators • Power Generation Equipment

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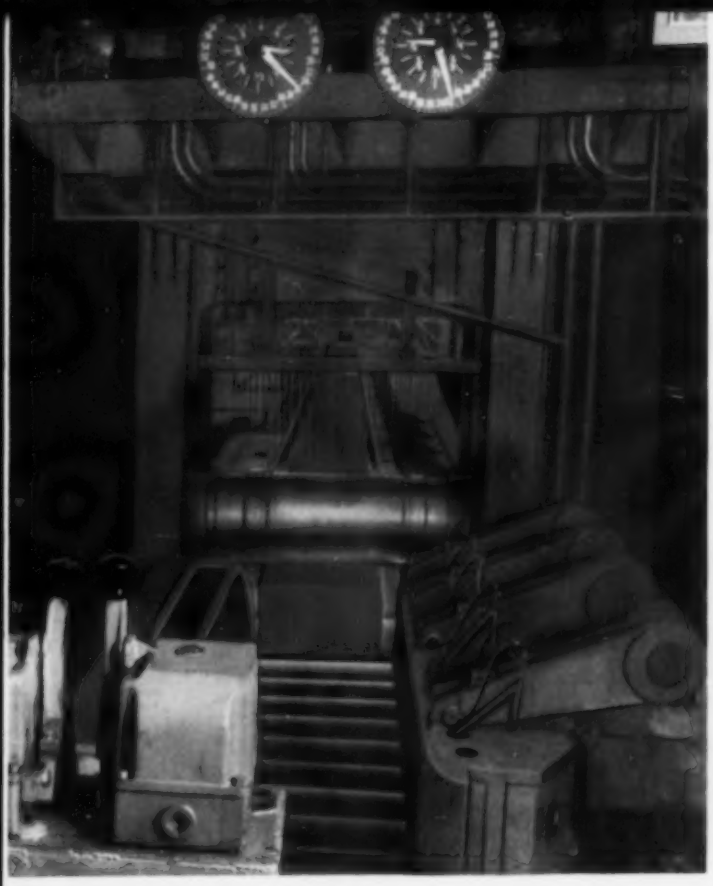
A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-5178

Regulex is an Allis-Chalmers trademark.



M-g sets supporting cold-strip mill motors. These units are rated at 7750 kw, 514 rpm. Furnished by Allis-Chalmers in 1946, they will be supplemented by new units.

M-G SETS

On the 56-inch temper mill, this 4-machine m-g set supporting the skin pass mill motors will be revamped. Two new 225-kw dc drag generator units will be furnished by Allis-Chalmers for this mill.

CONTROL

This variable voltage control board is used on the 56-inch tandem cold reduction mill. New control equipment is being furnished by Allis-Chalmers for new mill expansion at this midwestern steel plant.

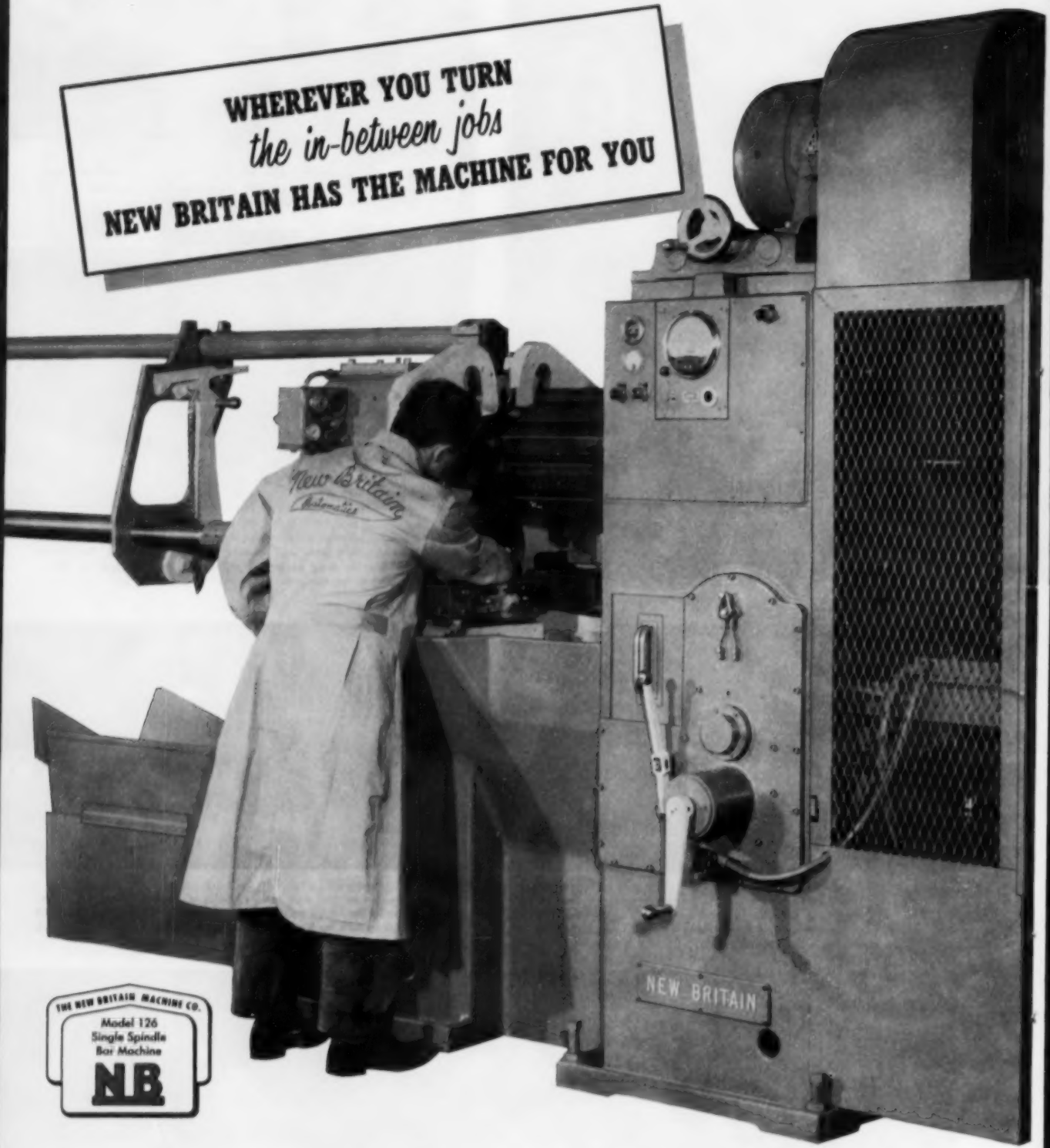
Regulex control and totally enclosed control board were furnished by Allis-Chalmers in 1948 for the 48-inch temper mill at Granite City Steel Co. Additional control is being furnished for the 56-inch temper mill.

MOTORS

Motor room view at this plant shows Allis-Chalmers units driving delivery reel and main stands. Allis-Chalmers motors furnish drive power throughout the plant. New motors, ranging in size from 25 to 5000 hp, are being installed.

Allis-Chalmers motors shown driving the temper mill include main roll drive, delivery tension, and delivery reel drive. Allis-Chalmers furnished original motors for both temper mills, as well as new motors for increasing capacity.

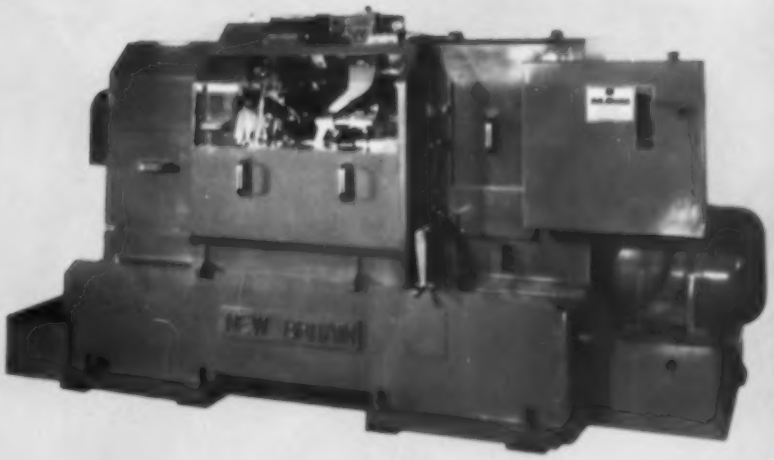
WHEREVER YOU TURN
the in-between jobs
NEW BRITAIN HAS THE MACHINE FOR YOU



In the big borderline area of production between hand screw machines and multiple spindle types, the Model 126 New Britain single spindle bar machine can make money for you. It's rugged, fast and highly accurate. It requires minimum set-up time for tool changes, cross slide cam settings and positioning of operational sequences on the central program drum. Capacity 2⅝". May we mail you more details?

WHEREVER YOU TURN
on multi-spindle bar machines
NEW BRITAIN HAS THE MACHINE FOR YOU

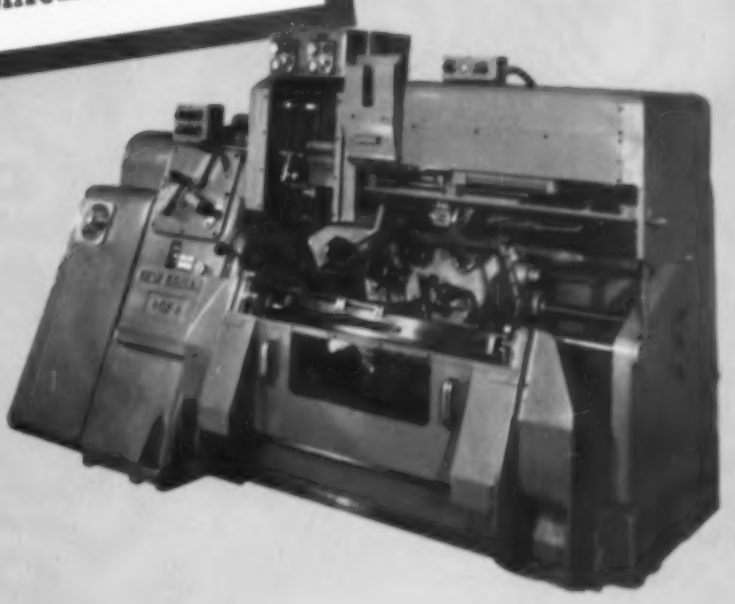
THE NEW BRITAIN MACHINE CO.
Model 62
Automatic Bar
Machine
NB



The new Model 62 New Britain bar machine has an independent radial cross slide in every position — opening new possibilities for effective tooling. New Britain "accuracy features" include spindle carrier lifting to eliminate wear during index, plus rigid locking of the carrier during the cutting cycle. Magazine loading available if desired.

WHEREVER YOU TURN
long or short runs
NEW BRITAIN HAS THE MACHINE FOR YOU

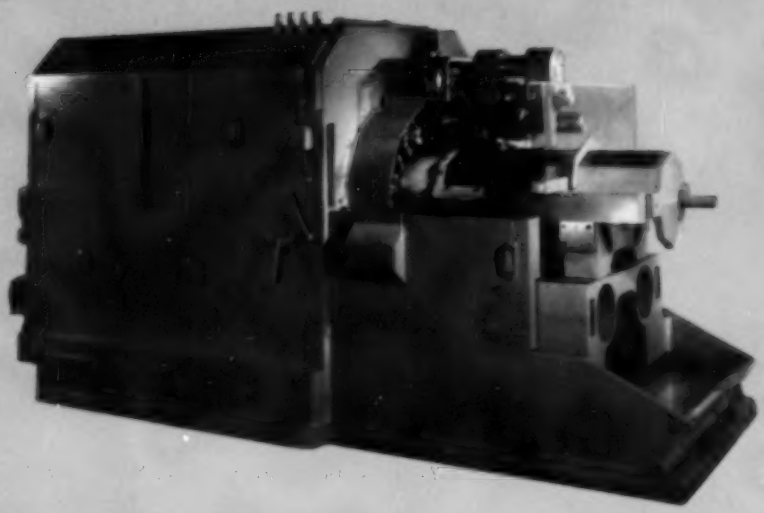
THE NEW BRITAIN MACHINE CO.
Model 11/70
New Britain +GF+
Copying Lathe
NB



The original New Britain **+GF+** copying lathe has grown into an extensive line, to meet the demand for the wide variety of applications for its better copy-turning principle. Regardless of length of run or the variety of pieces you make, you can use the New Britain **+GF+** profitably. Basic advantages are: fast setup, inexpensive tooling, elimination of the chip problem, minimum operator fatigue, and dimensional accuracy with good surface finish to reduce grinding allowances. Optional features include automatic re-cycling, automatic loading and ejecting.

WHEREVER YOU TURN
castings, forgings or pressed metal pieces
NEW BRITAIN HAS THE MACHINE FOR YOU

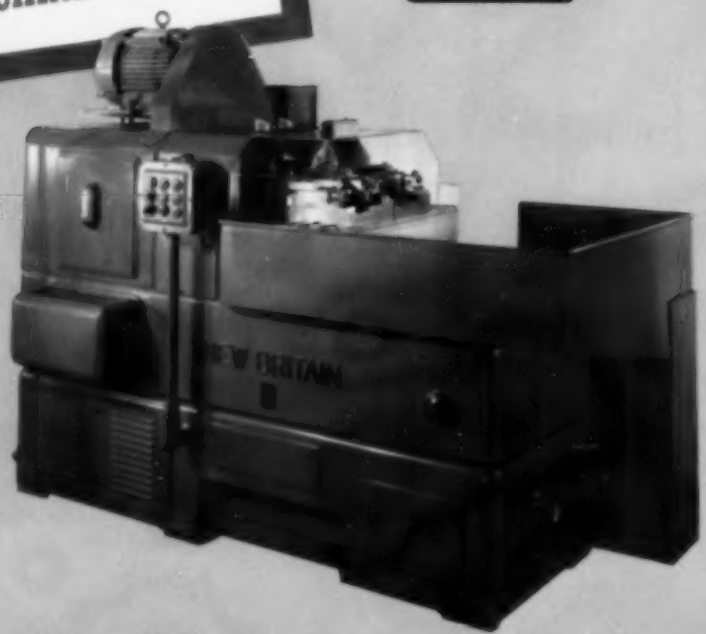
THE NEW BRITAIN MACHINE CO.
Model 810
Automatic
Chucking Machine
NB



Versatility, accessibility, quick setup and sustained high production of precision parts are what you look for in an automatic chucker. New Britains are famous for these features all over the world. Perhaps you are also thinking of the possible savings which automatic loading, unloading and automatic gauging could effect. If so, you will want to learn about the imaginative use of automated production which New Britain engineers are applying to chucker work these days. You can now handle bigger pieces than ever on New Britains too — up to fifteen inches in diameter.

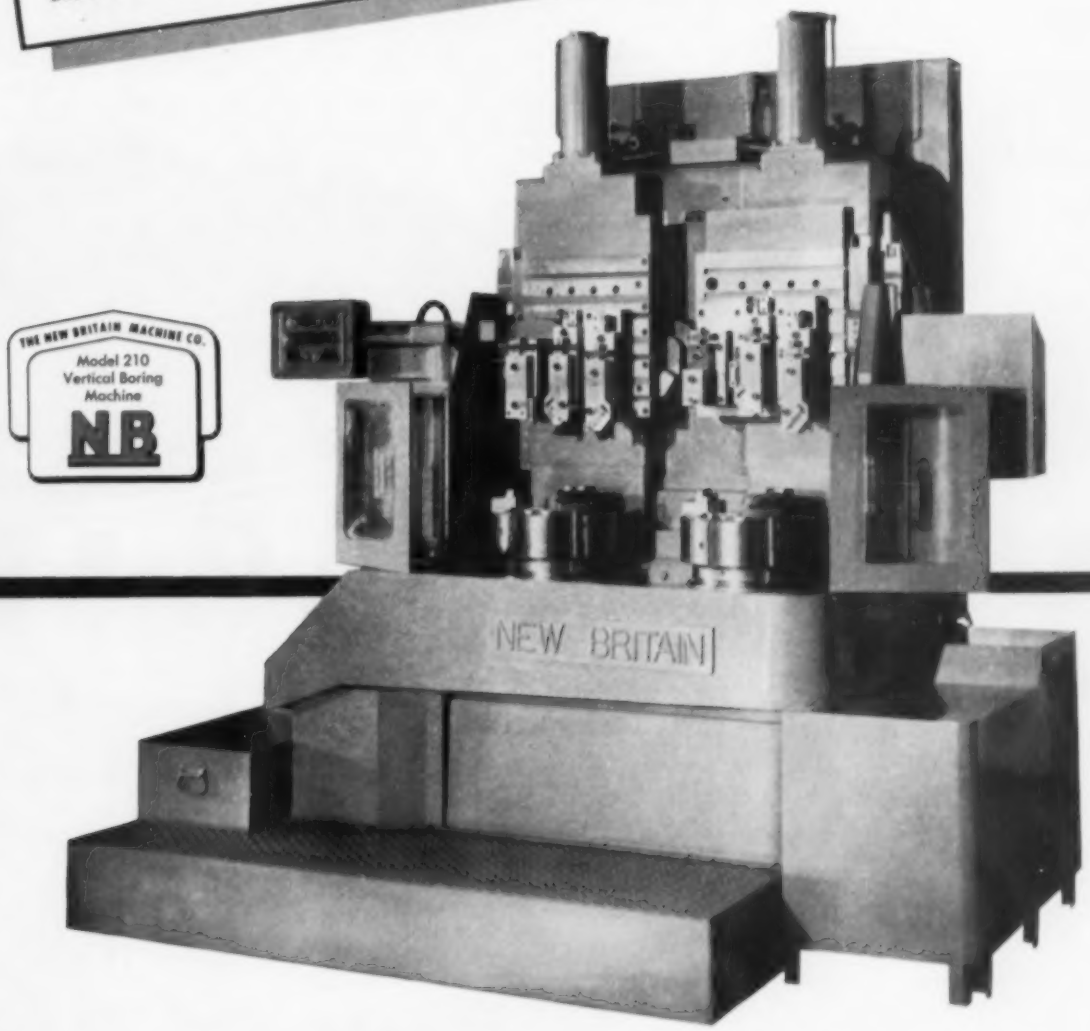
WHEREVER YOU TURN
or bore precision contour work
NEW BRITAIN HAS THE MACHINE FOR YOU

THE NEW BRITAIN MACHINE CO.
Model 37
Precision Boring
Machine
NB



New Britain precision straight and contour boring machines provide a new approach to machining parts that would be problem pieces on any other type of equipment. These simple, fast, accurate machines require minimum attention and utilize inexpensive single point tools. They make the most profitable use of automatic loading, gauging and tool adjustment where these features fit the job requirements. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

WHEREVER YOU TURN
or bore large, heavy pieces
NEW BRITAIN HAS THE MACHINE FOR YOU



Accurate cam control of tool paths is the essential to precision contour boring. The Model 210 New Britain precision *vertical* boring machine extends the speed, accuracy and fine finish of precision straight and contour boring and turning to a wider variety of work pieces. Perhaps this is the answer to excessive costs on some of *your* work.

NEW BRITAIN-GRIDLEY MACHINE DIVISION

The New Britain Machine Company • New Britain, Connecticut

OTHER NEW BRITAIN MACHINE TOOL DIVISIONS

LUCAS MACHINE DIVISION
Cleveland, Ohio
Precision Horizontal Boring, Drilling and Milling Machines

HOERN & DILTS DIVISION
Saginaw, Michigan
Multiple Spindle Precision Finishing Machines

You can build it better

BUILT TO LAST. Light in weight, strong and tough, highly resistant to corrosion and abrasion, the 40-ft. hull of this attractive houseboat, built of 12-ga. USS COR-TEN Steel, has what it takes to give long years of low-maintenance, trouble-free service. Customarily beached by being run right up on the shore, this boat needs COR-TEN Steel's superior strength and high resistance to wear and impact to withstand such rough usage. Says the owner, "Despite the fact that on five different occasions the boat has been dropped from the dry-dock from heights ranging from 6 to 12 feet—treatment that would have completely wrecked a boat of usual construction —the 5½-year-old hull is still in excellent condition and appears good for many, many more years." (This all-steel boat was constructed by Kelly Shop, Inc., Jeffersonville, Ind.)

• • •

USS COR-TEN Steel has been approved by the American Bureau of Shipping for use in hull construction, either riveted or welded, with a general reduction from mild steel weights or sections of about 10 per cent. Lloyds Register of Shipping has stated that COR-TEN Steel is acceptable under its rules as a special quality steel for ship building. Its use in oil tankers, ore boats, dredges, barges and pleasure craft, both in fresh and salt water service during the past 23 years, has definitely proved USS COR-TEN Steel's exceptional fitness for marine construction.

with USS High Strength Steels

In USS High Strength Steels, design engineers have at their command three service-tested steels that will permit them to materially increase the efficiency and economy of machinery, equipment and structures at little or no increase in first cost . . . and frequently at less cost.

All three of these famous *"steels that do more"*—USS Cor-Ten, USS Man-Ten and USS Tri-Ten "E"—have a 50% higher yield point than plain carbon steel. All have better atmospheric corrosion resistance and offer greater resistance to wear, fatigue and impact. Each, however, has specific superior properties that should be considered in determining its selection.

USS Cor-Ten Steel, for example, is distinguished by its superior resistance to atmospheric corrosion—4 to 6 times that of carbon steel. USS Man-Ten Steel is intended for weight reduction by means of greater strength in moderate forming applications, with enhanced resistance to abrasion and atmospheric corrosion. USS Tri-Ten "E" Steel's outstanding characteristics are excellent weldability and resistance to shock.

Used singly or in combination, these steels can advantageously replace carbon steel to increase the strength and durability of vital parts *without* increasing their weight. Or when the use of thinner sections is feasible, they can (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity of equipment without increasing total weight or the power required to move it.

• • •

You will find our 174-page *"Design Manual for High Strength Steels"* extremely useful in applying the benefits of these steels to your product. Send for free copy—simply write on your company letterhead to United States Steel Corporation, Room 5550, 525 William Penn Place, Pittsburgh 30, Pa.

"PREGNANT PLATYPUS." That's what the designers call this new combination trailer made to carry two completely unrelated types of products. Going in one direction it hauls 800 gals. of glue in the "dromedary" tank and 4,000 gals. in the belly tank below the trailer. On the return trip it carries 42,000 lbs. of plywood in the trailer van. To reduce empty weight and obtain greater strength—and at the same time to provide resistance to the mildly corrosive glue carried—USS Cor-Ten Steel was used in both tanks and in the trailer frame, body framing and cross frame members as well. As a result, the unit weighs 1,800 lbs. (11½%) *less* than if mild steel had been used, and will carry maximum payload, require less maintenance and last longer. Built by Peerless Trailer and Truck Service, Portland, Ore., for M and M Wood Working Company.

TO BEAT HEAT AND ABRASION. This asphalt mixing plant produces tar or asphalt road-paving mixes at a rate of more than 60 tons per hour. In the dryer, which removes the moisture from the sand and stone in the aggregate, temperatures run as high as 800° F. Abrasive action is severe.

To meet these conditions the Barber-Greene Co. of Aurora, Ill., builds the entire dryer drum (circle) of USS Man-Ten Steel. In this way they obtain one and a half times greater yield point than with carbon steel, greater abrasion resistance, and greater resistance to heat, impact and vibration. These qualities pay off by keeping the equipment more continuously on the job.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS MAN-TEN • USS COR-TEN • USS TRI-TEN

1933 USS HIGH STRENGTH STEELS 1956 — 23 YEARS OF PERFORMANCE — UNITED STATES STEEL

UNITED STATES STEEL

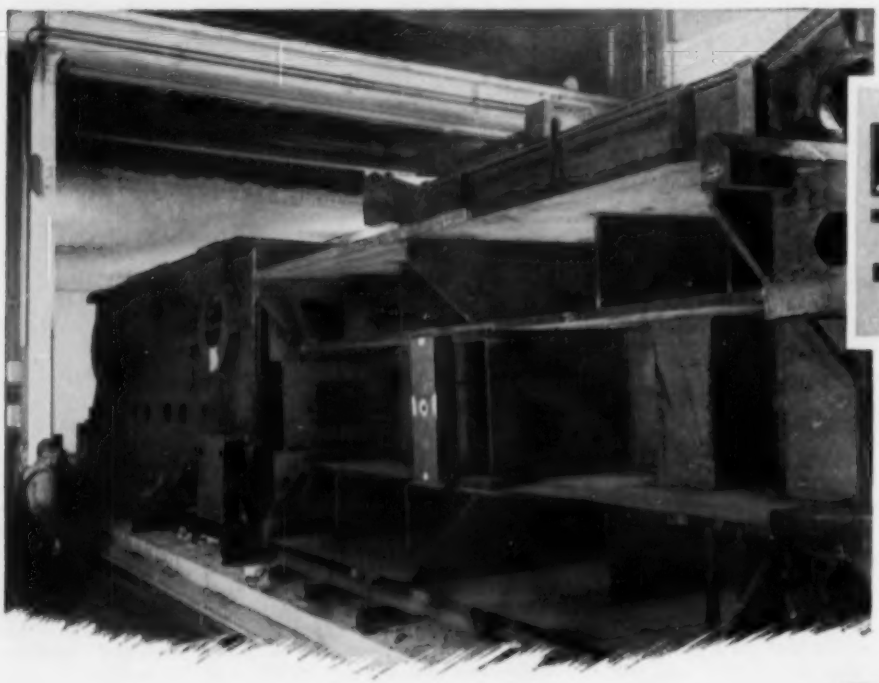
How Morgan stress relieving insures maximum design strength

● STRESS RELIEVING is one of many reasons why Morgan cranes provide longer, completely safe service under *any* operating conditions. Trolley frames, end carriages, trucks, drums, bearing caps, stripper barrels and rams, pit rams . . . all are stress relieved in Morgan's huge furnace capable of handling loads up to 250,000 pounds.

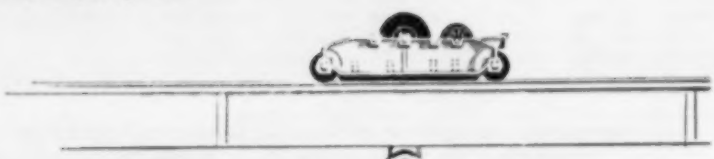
Morgan's stress relief furnace, one of the largest in the world, can raise temperatures 200 degrees Fahrenheit per hour up to 1750° F.

Stress relieving is still another example of the advanced design and construction features that make Morgan cranes the best in the business.

Performance records prove that Morgan cranes cost less to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



● Stresses built up in welding process are relieved in this 52 x 20 x 15 foot furnace. The 48 dual fuel burners are divided into three temperature zones, each zone controlled by an electronic potentiometer. Safety devices include high limit temperature controls, fuel shut-off valves. Combustion safeguards insure against over-heating.

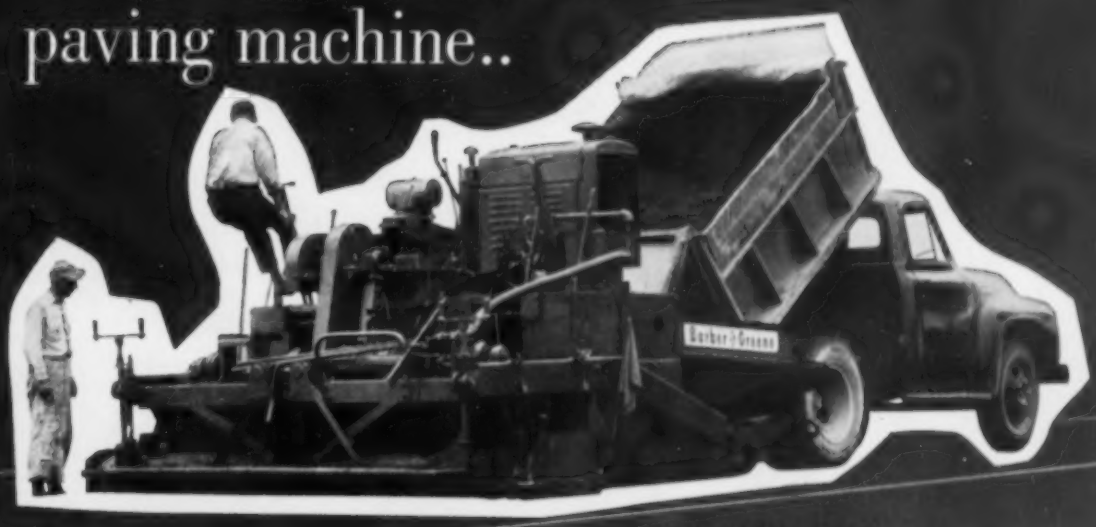


THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

.. for strength
.. for accuracy

16 important operating PARTS of this Barber-Greene paving machine..



.. are made of ground and polished

La Salle STRESSPROOF®
SEVERELY COLD-WORKED, FURNACE-TREATED
STEEL BARS

This dependable Barber-Greene paving machine uses 16 separate parts, all made of quality ground and polished STRESSPROOF steel bars.

Why STRESSPROOF? It has the needed strength, without heat treating . . the accuracy of the ground and polished finish . . plus excellent machining.

STRESSPROOF makes a better part at lower cost.

If you make parts requiring ground and polished accuracies or finish, plus these in-the-bar qualities . . (1) High Strength, without heat treating, double that of ordinary cold-finished shafting, (2) Machinability, fully 50% better than heat treated alloys of the same strength, (3) Wearability, without case hardening and (4) Minimum Warpage . . then STRESSPROOF offers you definite advantages. Write or call for further information.

La Salle manufactures America's most complete line of quality cold-finished steel bars.

Ask for your copy of helpful data bulletin No. 15 "Improve Quality . . Cut Costs"

La Salle STEEL CO.
1414 150th Street, Hammond, Indiana

Please send, "Improve Quality . . Cut Costs" booklet.

name_____

title_____

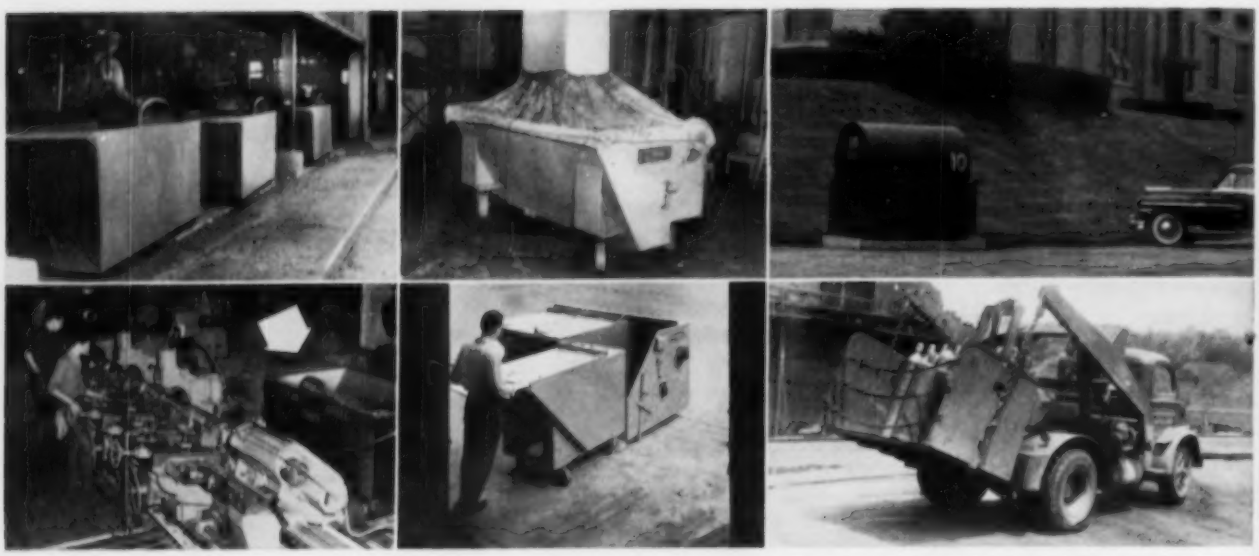
company_____

address_____

city_____ zone____ state____

Here's the most versatile....lowest cost of bulk materials handling by truck ever

With only one man, it PICKS UP . . . HAULS . . . Serves scores of big steel containers, all sizes and



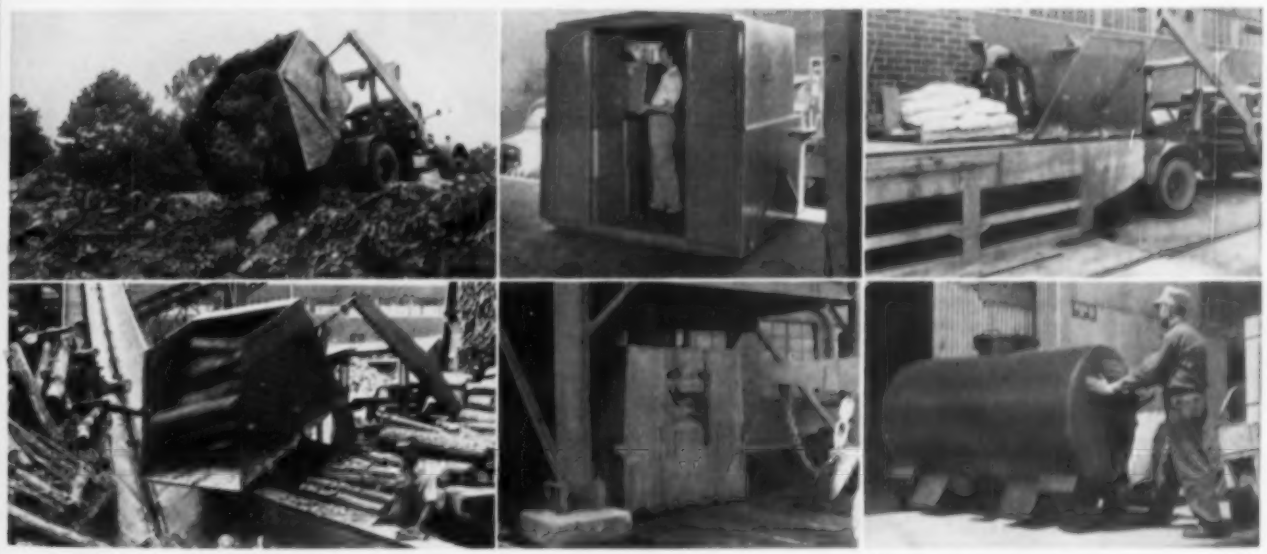
It's the DEMPSTER DUMPSTER® System

ABOVE ARE BUT A FEW of the hundreds of different Dempster-Dumpster Detachable Containers at work in industry today—containers built in capacities up to 21 cu. yds. . . . several times the capacity of the average dump truck body. It's like having one truck with scores of bodies!

method devised!

Here's MASS-HANDLING of bulk materials with one truck . . . one man! Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids, including acids, combustibles, dusty materials, etc. No other method handles waste and bulky materials so cheaply!

and DUMPS (or sets load down intact) designs — handling materials of every description



WITH NO OBLIGATION on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Ask us for complete information. Manufactured exclusively by Dempster Brothers, Inc.

5205

DEMPSTER BROTHERS
6116 Dempster Building, Knoxville 17, Tennessee

New plastisol compound applies sheet-like coating through spray gun

◆ **Unichrome "Super 5300" Coating announced by Metal & Thermit**

◆ **Durable, corrosion-resistant finish up to 60 mils thick achieved in one coat**

Despite the molasses-like consistency of plastisol compounds, they can be *sprayed*. Several years ago, Metal & Thermit produced the first successful type which permitted 20-mil-thick films per spray coat. New "Super 5300" goes way beyond this—with 60 mils or more per coat.

"Super 5300" Coating gives a thick "sheet" of protection. But since it is sprayed, no seams or joints exist as with conventional sheet materials.

STRONG CORROSION PROTECTION

A compound based on vinyl resins, Unichrome "Super 5300" Coating shrugs off strong acids, caustics, water, salt solutions and other corrosives. Its tough, thick flexible film absorbs impact without chipping, deadens sound, withstands abrasion. Satiny smooth in appearance, it makes an attractive as well as unusually durable finish. It can often permit ordinary metals to be used in place of costly alloys.

"Super 5300" can be used most profitably to line tanks, ducts, pipe and on large, unwieldy equipment or products. It requires uniform baking to cure. If desired, the services of firms specializing in applying Unichrome Plastisols can be used.

This is one of many Unichrome developments in processes and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.

Unichrome is a trade mark of Metal & Thermit.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

UNICHROME

METAL & THERMIT
CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit-United Chromium of Canada, Limited, Toronto

Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

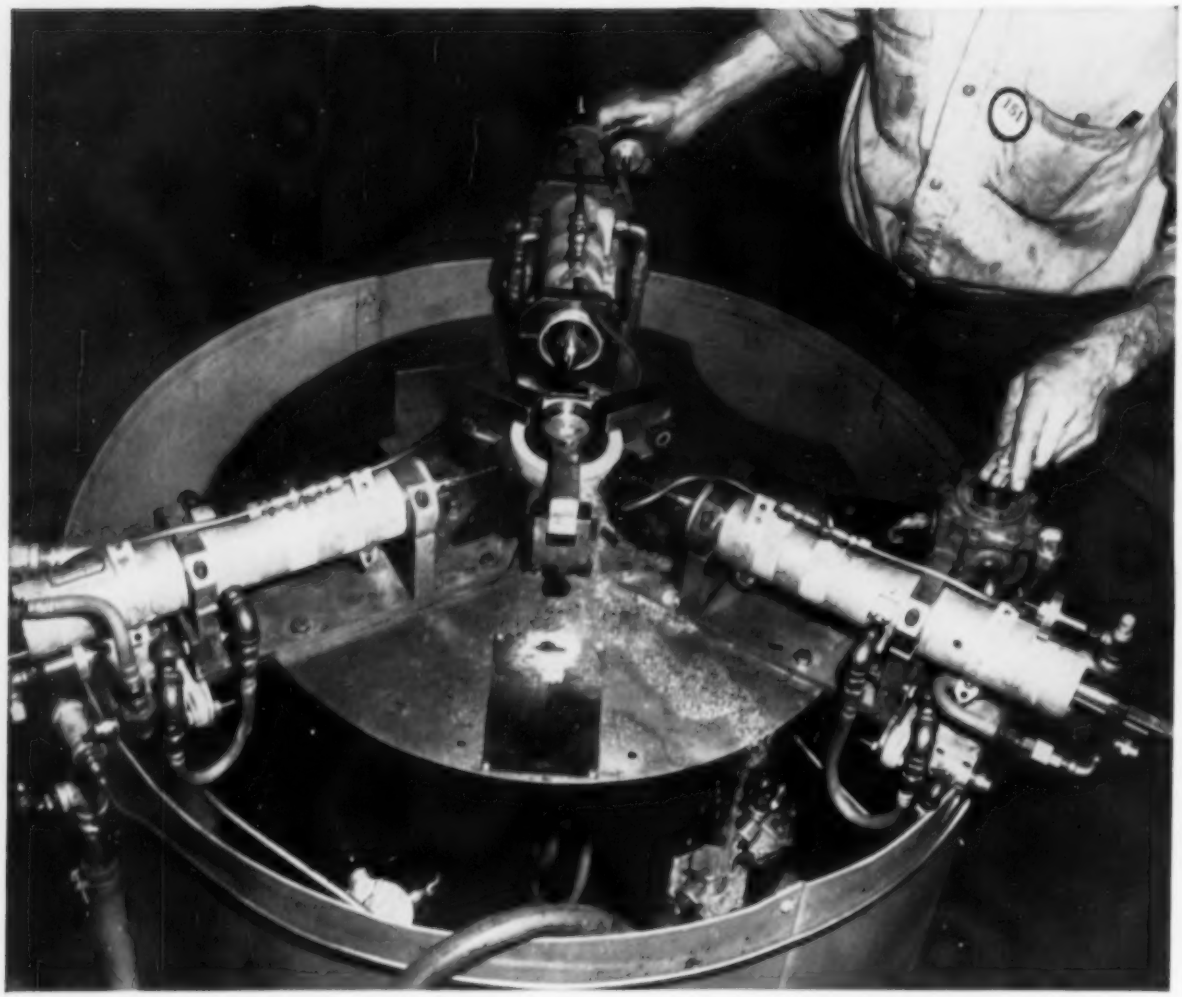
You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

S.S. United States... most modern, fastest liner afloat.

ROEBLING CF

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2360 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5240 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1500 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 5051 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK



When 1=3: Drilling 3 holes at 1 time in aircraft part. Keller Tool "Airfeedrills"® replace former slow method of drilling one hole and then shifting jig to the next spindle. Now, operator places part in fixture. Then opens air valve. All three "Airfeedrills" feed twist drills forward, simultaneously, to proper depth. The drills stop and return, automatically. The setup is flexible to handle different parts. Another example of time- and money-saving through air power . . . maybe it can work for you.

We'd like to hear from you

Keller Tool "Airfeedrills" are portable. A particular advantage in the aircraft industry. Take the tool to the job . . . make any setup and you're in business.

Other special features: sensing type rapid advance • hydraulic feed control • adjustable torque control—for peck drilling, skip drilling and other jobs formerly requiring expensive machine tools.

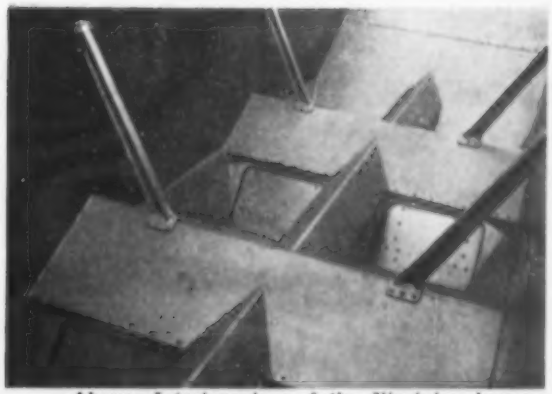
WHY NOT POSE YOUR PROBLEM? The Keller people have come up with some good solutions. It's possible they can help you.

GARDNER-DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

On the Virginian coal rides on YOLOY E



Above—Interior view of the Virginian hopper car, showing how Yoloy E plates are welded and riveted in car construction.

Five hundred 70-ton hopper cars like this one, to be built in the Virginian shops this year, will use Yoloy E plates. These rugged cars will soon join fleets of thousands of others built of high strength steels, to haul the nation's coal from mines to market.

Yoloy E has high resistance to corrosion, abrasion and shock which results in lower maintenance and greatly lengthened life for hopper cars, box cars and other rolling stock.

The excellent forming and welding qualities of Yoloy E meet all requirements for railroad construction. More than 20 years of proven service on American railroads demonstrate every day the extra values obtained from the Yoloy Family of Steels.

THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY S
(Nickel-Copper)
High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
High Strength Low Alloy Steel

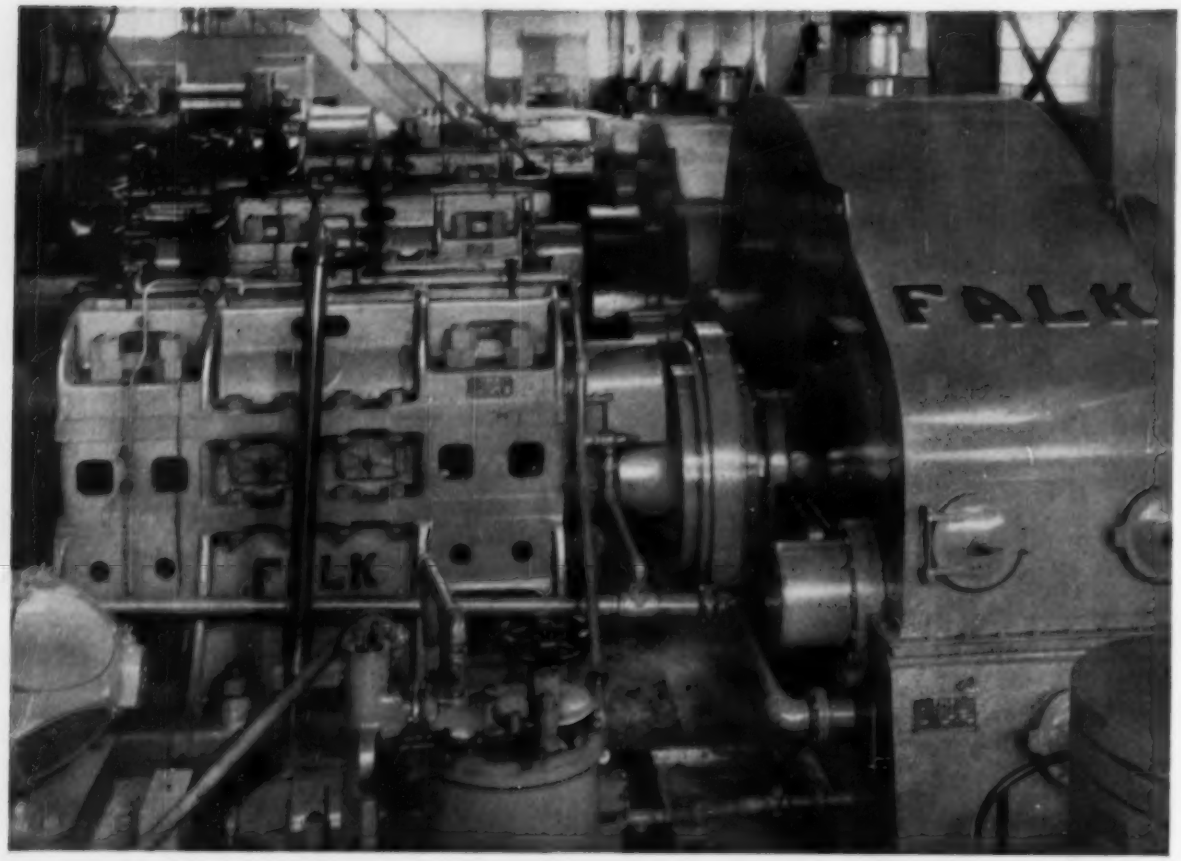
Youngstown

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS



Better protection under pressure

EVEN UNDER SHOCK loads and prolonged heavy duty service, *Texaco Meropa Lubricant* keeps reduction gears and bearings running smoothly, on the job longer. Here's why:

Texaco Meropa Lubricant contains special EP properties that toughen its lubricating film, extend its effective protection far beyond normal requirements. And the polar additives in *Texaco Meropa Lubricant* enable it to adhere to metal under *all* conditions.

Texaco Meropa Lubricant resists thickening under heat, will not foam. It remains stable in use, storage or centrifuging—is non-corrosive to all gear and bearing metals.

For roll stand circulating systems, use *Texaco Regal Oil*. This turbine-grade oil keeps systems clean, resists oxidation and sludging, assures full protection for oil film bearings.

Contact a Texaco Lubrication Engineer soon and put these cost-savers to work in your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N.Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

STEEL

November 26, 1956

Metalworking Outlook

Suez and '57 Prospects

Troubles in the Middle East will have these major effects on U.S. metalworking's domestic business next year: 1. The tendency toward inflation will become more marked. 2. Inventory build-ups of readily obtainable products will be more substantial. 3. For the first six months at least, production will be hitting capacity limits in most lines (performance would be almost that good even without the Suez problem). 4. Shortages, particularly in plates and structural steel, will become more serious (see appraisals of impact the tanker programs will have, pages 64, 139).

Gray Market in Steel? Not Yet

Discount talk of a gray market in structural steel. So-called premium prices reportedly paid in some areas turned out to be the difference between mill and warehouse quotations (after STEEL editors looked into the rumors). Some projects are being deferred for lack of structurals, and there has been some switching to reinforced concrete. In one case, premium prices resulted because a school board decided to push a completion date ahead without first checking on the availability of steel. The board learned the hard way that warehouse steel costs at least 30 per cent more than the mill product.

Britain Tightens Its Belt

Structurals and plates are short in Britain, too, and likely will be even more difficult to get once the impact of oil cutbacks is felt. The steel industry in England consumes 1.5 million tons of fuel oil a year, but now must curtail that by 10 per cent. Closing of the Suez for at least six months (and probably longer) will also reduce movement of raw material into the country and the export of finished products. One silver lining: Steel stocks, with the exceptions noted, are higher now than they were a year ago.

More Scrap Export Controls?

Look for renewed agitation to limit iron and steel scrap exports because of the danger of World War III. Shipments abroad this year will total about 5 million gross tons, compared with 4.5 million last year (see page 141). On all matters of controls and mobilization planning, Washington continues its wait-and-see attitude.

Report on the Edsel

Ford Motor Co.'s Edsel will have its own engine. One line will have some body stampings interchangeable with Fords; another line will be interchangeable with some Mercury panels. All tooling is released, but none has been received so far. The cars will be built in Ford and Mercury plants but marketed by a separate dealer organization. Anticipated is a market volume of 200,000 cars a year. The first Edsel will be unveiled later in 1957, probably in time for 1958 model announcements. Rumors have it that the body styling will put it in competition with Studebaker's

Hawk series as a family-sized sports car. Price will be in the medium range.

October Tool Shipments: 31-Month High

October's machine tool shipments hit $89.7 million, highest since the $96.8 million shipped in March, 1954. The National Machine Tool Builders' Association reports that net new orders amounted to $66 million in October, making the industry's backlog 7.2 months, compared with 6.1 months at the end of October, 1955.

Handling Equipment: Up 10 Per Cent

Material handling equipment sales will rise 10 per cent in 1957, predict directors of the Material Handling Institute. Although MHI's bookings index shows a sharp dip in September, total bookings for the first nine months are 31 per cent ahead of those in the same 1955 period. Equipment emphasis in 1957: Ease of maintenance, mechanical and electronic controlled transfer mechanisms, improved dispatch and system controls, more versatile attachments for cranes and industrial trucks.

What To Do About Monday

If your employees agree, you can give the Monday before Christmas and New Year's off and make up the time on the Saturdays before or after the holidays without paying overtime. A new Department of Labor policy says that under those conditions it will raise no question of failure to comply with the overtime pay provisions of the Fair Labor Standards Act or the Walsh-Healey Public Contracts Act.

Washington Notes

The Defense department would like to standardize the construction machinery it buys for offshore use to simplify maintenance problems. Machinery builders question the practicality of such a move . . . The Pentagon has released a report on areas of electronics needing further basic research in the interests of national defense . . . The Civil Aeronautics Administration has ordered 23 long-range radars, the heart of CAA's new traffic control setup. Raytheon Mfg. Co. will make them for about $9 million . . . Congress' Joint Economic Committee will hold hearings after the first of the year on its study concerning prices, wages and profits. The steel industry will be a prime witness once the show gets under way.

Straws in the Wind

New car stocks on Nov. 1 (276,378) were the lowest in nearly two years; used car inventories (a 22 days' supply) were the lowest since June, 1952 . . . International Nickel Co. of Canada Ltd. is about ready to start work to develop one or more mines at its Mystery-Moak Lakes nickel ore discovery in Manitoba . . . The National Park Service has about $12.5 million worth of construction on four national parkways under contract . . . New executive lineup at Youngstown Sheet & Tube Co., effective Dec. 1: J. L. Mauthe, chairman; Alfred S. Glossbrenner, president; Walter E. Watson, vice chairman; William H. Yeckley, vice president-operations; Frederick M. Mayer, vice president.

problem

CMP
RESTRICTED SPECIFICATION
COLD ROLLED STRIP STEEL
Processed to meet special gauge tolerances and provide special finishes and physical properties . . . solves many fabrication, cost & performance problems.

Helping to overcome metal fabricating difficulties, improving products without skyrocketing costs or just getting costs down are usual events with **CMP.**

For example, the manufacturer who was heat-treating formed steel parts subsequently assembled with other components into a powered unit. The forming involves severe deformation and was hampered by lack of uniformity in the annealed strip steel. Distortion in the heat treatment followed, resulting in a low percentage of finished assemblies passed as satisfactory.

To minimize these fabricating difficulties, **CMP** developed a special annealing process for the strip. Using this steel, parts, when subjected to the manufacturer's standard heat-treating practice, were acceptable and yield was greatly increased.

At **CMP,** processing cold rolled strip steel to restricted specifications has been reduced to an exact science and **CMP** men have been trained to spot opportunities for solution of production cost and product improvement problems through application of restricted specifications.

Why not put your problems up to a **CMP** man?

C M P

THE COLD METAL PRODUCTS CO.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, IND.
SALES OFFICES: NEW YORK CLEVELAND DETROIT INDIANAPOLIS CHICAGO LOS ANGELES SAN FRANCISCO

solved

CMP
RESTRICTED SPECIFICATION
COLD ROLLED STRIP STEEL
is available in
Low Carbon Grades • High Carbon Spring Steel (annealed and tempered) • Stainless Types • Alloy Grades • Electro Zinc Coated

Armco Stainless in Jet Engine Spark Plugs

Fights Heat, Machines Better, Costs Less

Free machining "stabilized" Armco Stainless Steel bar stock replaced a high-nickel alloy in this right-angle jet engine spark plug. Here are three reasons why Armco 18-10 Cb-Ta FM Stainless Steel was chosen for the barrel around the ceramic:

1. **It withstands the heat and is stabilized against harmful carbide precipitation.**
2. **The *Armco Stainless Steel bars machine better*—special free-cutting elements are added.**
3. ***It costs less than the metal formerly used.***

Problem Solvers

Looking for a solution to a product-problem? One of the special grades of Armco Stainless Steel could be your answer. Armco's new precipitation-hardening grades, for example, are giving corrosion resistance and extra high strength and hardness to products of many kinds. Extra-low-carbon stainless steels produced by Armco give top protection to weld areas in equipment exposed to corrosive service.

Call the Armco Sales Office near you, or write to the address below for complete information about standard and special grades of Armco Stainless Steel.

Easy-to-machine Armco 18-10 Cb-Ta FM Stainless Steel (Type 347 F) forms the barrel around the ceramic on this jet engine spark plug. It replaces high cost high-nickel alloy. The plug's threaded end is Type 416 stainless; the flange is Type 430. **Photo courtesy Champion Spark Plug Company**

ARMCO STEEL CORPORATION

2076 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Our Business Abroad

Because of the upheaval in Europe and the Middle East, American industry must clarify its role in international affairs.

The purging of Stalinism in Russia and the partial lifting of the Soviet iron hand in Poland led to the belief that an en'ightened communism was ready for competitive coexistence with the West.

But, step by step, this belief has been shattered. The trading of Russian munitions for Egyptian cotton gave President Nasser the wherewithal to flex his muscles.

The real shockers came when Soviet tanks crushed the last vestige of freedom in Hungary, and "volunteer" troops were offered to the countries in the Middle East.

The good will tours of Bulganin and Khrushchev have had a profound effect on alliances and trade, especially with India and the South Asian countries.

Coup'ed with the return to Stalinism is the revolt against colonialism. Individual peoples are determined to pursue their own destinies and not look to mother countries thousands of miles away for guidance.

In this setting, America stands out more prominently than ever before as the No. 1 nation in opposition to Soviet Russia. Since the Nov. 6 election, President Eisenhower has not deviated from his belief that America must maintain a firm position in international affairs within the framework of the United Nations. Help will be given without attaching economic or imperialistic strings to it.

In keeping with government policy, industry undoubtedly will find it advisable to work co-operatively with individual countries. For instance, a delegation from India is seeking American licenses to build the machine tools, presses and other equipment it needs to establish its own metalworking industry.

India, like many other countries, will find a way to make many of the things it needs to raise her living standards.

American industry should help India and other freedom loving countries. The economies of underdeveloped countries should be built to the American pattern, not the Russian.

Our policies and programs of today will be felt for many generations to come.

Irwin H. Such
EDITOR-IN-CHIEF

BUYERS GUIDE TO STAINLESS

A Directory of Ryerson Stainless Steels and Services

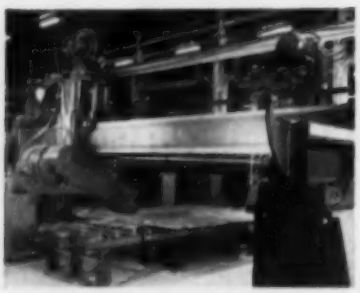
Here's a quick guide to the nation's largest stocks of stainless steel—2,351 sizes, shapes, types and finishes of Allegheny stainless in stock at Ryerson.

This wide selection assures you of getting the best stainless for every application. Extra care in storage, handling and shipping—such as padded shear clamps to protect finish and flatness of sheets—guards the high quality of Ryerson stainless stocks. And in addition, the help of full-time stainless specialists is yours when you call Ryerson.

See your Ryerson catalog for a complete listing of stocks and call your nearby Ryerson plant for quick shipment of Allegheny stainless—one piece or a truckload.

SHEETS—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs.

PLATES—Available in 9 analyses including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also extra low carbon types for trouble-free welding.



TRUE-SQUARE DISC CUTTING—Stainless plates up to 12' x 25' cut absolutely square on abrasive disc machine. Length and width tolerance plus or minus 1/32".

A NEW STEEL—Type 202 Allegheny Stainless is available in 14 to 26 gauge sheets. Type 202 compares favorably with 302 in corrosion resistance; costs 2¼¢ per lb. less.

BARS AND ANGLES—Rounds, squares, flats, hex's and angles in 8 types including free-machining bars with both analysis and mechanical properties controlled for best performance.

CIRCLES, RINGS, SPECIAL SHAPES—Practically any shape, no matter how intricate, can be accurately flame cut from stainless steel plate by skilled Ryerson operators.

PIPE AND TUBING—Light wall, standard and extra heavy pipe, ornamental and regular stainless tubing. Also flanged, screwed, welding and Quikuple fittings and Cooper stainless valves.

AIRCRAFT STAINLESS—Sheets, strip, plate and bars to Government and Aeronautical Specs. Write for Ryerson Aircraft Steels booklet.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK · BOSTON · WALLINGFORD, CONN. PHILADELPHIA · CLEVELAND · CHARLOTTE · CINCINNATI · DETROIT · PITTSBURGH · BUFFALO CHICAGO · MILWAUKEE · ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

U.S. Air Force

Aircraft: Feast, Not Famine

As military and civilian business continue to be good, the industry is in for a period of stability. Watch for more subcontracting to spread out the dollars

"THERE ARE only two types of aircraft — the obsolescent and the experimental," states Adm. DeWitt C. Ramsey (USN, ret.), president, Aircraft Industries Association.

Air Force Secretary Donald A. Quarles says: "One of the two essential elements to the strategic position of the Free World is a powerful retaliatory force, a kind of air-atomic strategic reserve constantly ready to respond to aggression."

Outlook Good—Those two statements pretty much wrap up the present joys and sorrows of the aircraft industry. On the happy side is an at least temporary end to the industry's traditional feast and famine (though a few companies may at times get caught between contracts).

Expectation is for industry-wide business to hold at about the $8-billion mark for the next several years.

All in all, the outlook is good for the 41 airframe builders, 25 engine manufacturers, 20 helicopter firms, 25 missile producers, 12 propeller companies and 2000 organizations that make and distribute aircraft equipment, plus 50,000 suppliers.

Prospects—Most comments on next year's business fall between these two extremes: Bell Aircraft Corp.: "It is expected that 1956 sales will show a slight increase over 1955's and that 1957 sales will gain substantially." A 100-percent military supplier: "Steady; no major change."

Rising backlogs add to confidence: Douglas Aircraft Co. Inc. has $2.3-billion worth of orders—about half of them are commercial, the highest percentage for that line in the company's history. Boeing Airplane Co. reports its sales in the first nine months of 1956 are 14 per cent over those in the same period a year ago. Its backlog for the same period is $3.2 billion—$550 million of it (17 per cent) is for jet airliners. Lockheed Aircraft Corp.'s backlog is at a three-year high of $1.6 billion. Republic Aviation Corp.'s is over $400 million, and additional business worth $160 million is being negotiated. Ryan Aeronautical Corp. sees sales up 10 per cent this year over last, with another increase expected for 1957.

Growing—Many expansion plans are in the works. Boeing will spend about $60 million in 1956 and 1957. Lockheed has spent $21 million already this year, compared with $15 million in all of 1955. Glenn L. Martin Co. is building a $10-million installation at Denver (employment of 5000 expected by 1960), and has acquired a 10 square mile site near Orlando, Fla. North American Aviation Inc. will spend $26.9 million on machine tools in 1957, compared with $24 million this year.

The industry's headaches come mostly from its biggest customer, the military, which takes more than 80 per cent of output. The requirements and technological advances of military aircraft are putting a strain on engineers, materials and even crystal balls. Some aircraft firms are already at work

on designs that won't be asked for by the military for four or five years. The companies figure they have to work that far ahead to be ready with a design when it's asked for. Thinking is already in terms of planes and power plants for four and five times the speed of sound.

Costs—Growing complexity compounds development costs. It takes a minimum of $50 million to develop a high-thrust turbojet or turboprop engine, not counting the expense of tooling for production.

But, states William B. Bergen, Martin's executive vice president: "Dollars are only one measure of what is bought. If we put development on a dollar basis, we would get cheaper aircraft but not such good ones. Change is a part of our normal way of doing business; it's seldom that even two of the same type of aircraft come out exactly alike. That's expensive and no one really likes change on that basis, but if it makes a better airplane we have to do it."

Keeping Up—To keep pace with progress, the industry employs about 25 per cent of all research and development personnel working in all industries, the Aircraft Industries Association estimates. Total employment of about 750,000 puts the industry not far behind motor vehicles, which ranks first in metalworking employment.

Almost 10 per cent of employees are engineers, and that figure is destined to grow: A new fighter-bomber requires 1 million engineering man-hours for production design, its World War II equivalent, only 100,000. A modern fighter takes 7400 hours of inspection, its World War II counterpart, 1770.

Ranking right with the engineering shortage as top problems are new materials and ways to fabricate them. Aircraft materials capable of standing 1000 to 3500°F will be needed in the next ten years. By 1961, says AIA, the industry wants materials for 500 to 1000°F range. That search will lead to greater use of stainless, more honeycomb construction (including new core materials such as foamed metals), more welding and adhesives for fastening. Needed are bigger welding machines to handle large wing and fuselage skins, additional work on welding high temperature alloys and adhesives that will stand up under high temperature.

Brazing will likely continue important for some time, though many firms prefer welding because they could eliminate filler material to save weight, but they don't think welding is advanced enough at present. Ultrasonic brazing may show promise. Another goal is quicker and easier ways of forming titanium. Plastic dies are becoming more important because they are easier and faster to work than their metal counterparts.

Spreading Business—Watch for more subcontracting. "Growing complexity is calling for new techniques, methods and materials. Specialization in the industry requires support of more outside firms to furnish specific mate-

Why Work for Uncle Sam?

"MILITARY aircraft are always stepping closer to the technical frontiers." That's how William B. Bergen, executive vice president of Glenn L. Martin Co., sums up his company's reasons for concentrating on government work.

"We feel we can use our engineering and production talent better in this direction," he adds. "When building military aircraft, you compete strictly on the basis of major technical breakthroughs; that appeals to Martin more than civilian business." But he doesn't rule out Martin's re-entry into the commercial field "if the opportunity is just right."

Looking Ahead—Working on the frontiers brings its special problems. "We once thought everything would be O. K.," says Mr. Bergen, "when we got through the

sound barrier. Then we learned about the heat barrier, and we're not through that yet. But we solved last year's problems, and we'll solve those ahead.

"It will mean a revolution in the use of metals; primary structures of aluminum have seen their day. If a new type of construction can be evolved, stainless steel will be a major metal in skin and structural members. But we'll need new fabrication techniques. Stainless steel honeycomb is already in use."

An engineer who moved into management, Mr. Bergen has been with Martin since he was graduated from M.I.T. with a degree in aeronautical engineering. He has been chief vibration engineer, chief flight test engineer and chief of Martin's guided missile section. He held two other vice presidential posts before his present position.

Systems Management—He was in large part responsible for the introduction of "systems management" at Martin. It aims at producing weapons systems, keeping quality up, lead time at a minimum. "The complexity, the competitive situation, the rapidly changing requirements in the aircraft industry add up to an unrelenting need for highly trained people," Mr. Bergen states.

"We can't afford to send our skilled personnel out into the economic wilderness when we don't happen to need them because we'd never get them back. But we must meet another aggravation of the aircraft business—feast or famine. So we carry a large number of projects not only as justification for keeping a full force of skills but also because in the aircraft business we are never quite sure whether weapons under development today are going to meet the requirements of tomorrow."

Rounding Out—"Each active project is in charge of a single operations manager who in effect becomes president of a miniature company with engineering, manufacturing, procurement and other necessary people reporting directly to him," Mr. Bergen explains. "As engineering, tooling and manufacturing build to a peak and then fall off on one project, skilled personnel are transferred to another as the need exists rather than being periodically laid off and rehired."

"I don't pretend that this is the last word in modern industrial organization, or that if all aircraft plants were set up this way, everything would work out fine. We're still experimenting with it, but it seems to fill our needs."

rials," reports one firm. Another adds: "Our letting of subcontracts may grow, particularly on military orders because of pressure for subcontracting to small business." Even now, some firms subcontract 45 per cent of their business.

Indications are that more firms are interested in subcontracting. Martin receives an average of 60 letters a month from companies wanting to do business with it. Boeing says it does business with 5200 firms in the Seattle area and 4340 in Wichita, Kans.

Reasons for interest in subcontracting: 1. Large volume of defense business. 2. Extensive government publicity concerning small business. 3. Need for more suppliers to provide rapid expansion in a national emergency. 4. Movement of industrial firms which creates surpluses of labor for supporting concerns. 5. Desire for expansion.

Why Not? — Why some firms don't get subcontracts: 1. Modern aircraft, missile, electronic and nuclear projects require high technical skills and special machinery; many firms don't have and can't acquire them. 2. Government regulations are complicated; many firms aren't equipped to operate under them. 3. Security regulations limit placing of contracts to firms that can comply. 4. Fear of some companies that defense contracts will be terminated.

Late news on nuclear-powered aircraft: Martin has formed a management team to push development of a nuclear seaplane. For three years, the firm has worked on airframe engineering studies for the Navy and feels that the Navy's Aircraft Nuclear Propulsion program has matured to the point where transition to airframe development is a necessity.

Civilian Side — On the civilian end of the business, five companies hold firm orders or options for 600 jet and turboprop airliners worth more than $2 billion. Making up the total are 341 four-engine jets worth $1741 million and 259 turboprop jobs worth $323.5 million. Civilian aircraft production this year and next is estimated at about 6000 a year, compared with 4753 in 1955.

Comment: "Commercial acceptance of the helicopter continues to grow and Bell Aircraft Corp. is enjoying its best year. At the three-quarter mark, 100 commercial helicopters have been sold and delivered, an increase of 30 per cent over the same period last year."

"The outlook for civilian business is good," says Fairchild Engine & Airplane Corp., which is banking on its turboprop F-27 airliner and a four - jet utility transport to crack back into the civilian market.

None of the aircraft companies contacted for this report by STEEL expressed any concern that the Middle-East situation would alter their immediate plans for 1957.

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Reynolds Metals Co.

Aluminum Looks Ahead

ARCHITECTS take note: Aluminum can become the material with which we will produce a truly contemporary architecture. But, we continue to use it as a substitute for other materials, rather than for its own attributes.

That's the challenge thrown out by Reynolds Metals Co., Louisville. It comes in the form of a two-volume work, *Aluminum in Modern Architecture*, which cost the firm over $500,000 to compile and publish. The authors are John Peter, head of John Peter Associates, New York, and Paul Weidlinger, a New York architectural engineer.

New Horizons — "The engineer who would not think of designing a concrete beam in the same shape as a steel beam has thought of an aluminum beam in the shape of a steel beam, perhaps because they are both metals," says Mr. Weidlinger.

A book like this one is needed to stimulate such thinking, believes Reynolds. Described as "the most thorough and complete book on the use of aluminum in architecture published to date," volume I shows how aluminum looks (101 important buildings throughout the world); volume II is a technical handbook of aluminum engineering, design and detail.

Conversation — The authors traveled the U.S. to tape record conversations with 26 leading architects, all of whom see more use of aluminum in architecture coming. Their comments appear in volume I. Here's a sample of their ideas:

Materials—"I was quite in opposition to the idea that architecture should be measured by the pound or by the ton." (Richard Neutra)

Prefabrication — "Natural competition in the market will result in building parts with a great variety of appearance, even though they are made to the same dimensions." (Walter Gropius)

City Planning—"We won't speak about buildings, but about spaces between buildings. We will speak about squares and streets as a form of architecture." (Marcel Breuer)

Extrusions—"Nothing can equal aluminum for extrusion . . . and extrusions will get larger and larger." (Philip Johnson)

"You can develop details which not only have the shape that you want on the outside, but which can be attached without any bolts or nuts showing, simply by snapping them on and off." (Robert Alexander)

Structurals—"There would be a tremendous potential for aluminum in structural framework if aluminum shapes, like I-beams and H-columns can be developed. Because of its light weight, one man could erect and bolt a frame together, probably in a day or two." (Craig Ellwood)

Alloys—"Alloys are the key to the future. Any forecast about aluminum is going to depend entirely on the history of the development of its augmented tensile abilities, its augmented alloying abilities, its associability with other chemical elements." (R. Buckminster Fuller)

Curtain Walls — "The research building at General Motors has a wall development that I personally believe is the answer. It's an extruded aluminum frame which is about 12 ft high from floor level to floor level and about 10 ft wide. It is an aluminum extrusion that is put in place." (Eero Saarinen)

Architecture—"If you have to construct something, you can make a garage out of it or you can make a cathedral out of it. The same means, the same structural methods you use for all these things." (Mies van der Rohe)

Stability in Copper Castings

Shipments are slightly ahead of 1955's but have not kept pace with population growth or metalworking expansion. The ten-year record shows little change

THE NATION'S 2700 brass and bronze foundries have to run hard to stay where they are.

Casting shipments over the last ten years tell the story. Production has deviated markedly from the average (nearly 500,000 net tons) in only three of those years. Shipments in the recession years were low: 362,000 tons in 1949 and 418,000 tons in 1954. The best year of the last decade was 1951 when military and civilian uses brought the total up to 589,000 tons.

This Year—So far, shipments are about 3 per cent ahead of last year's, which hit 504,000 tons. Automotive production during the last quarter may be the fillip needed to insure that shipments this year will be the best since 1951. Next year will be substantially the same as this one, but there is a possibility of a slight increase.

Prices—Volatile, the copper market has been a problem for foundries. When prices went up, foundries found that they had to nearly double the value of their inventory (in time of tight money) to do the same amount of business.

Recently, falling prices have prompted some foundry customers to live off inventory. But A. C. Dappert, vice president of sales, Mueller Brass Co., Port Huron, Mich., thinks present prices will hold for at least six months.

E. H. Mueller, president of Lincoln Brass Works Inc., Detroit, feels that the erratic course of copper prices in an indication of speculation rather than an effect of supply and demand.

One reason for price fluctuations is that the copper market is world-wide. Generally, the U.S. imports 30 per cent or more of its copper. Prices of metals with which copper competes are determined on a national level.

A Surprise—Many foundries say that lower prices would not materially increase their business. (Only in a few cases did the recent price spiral cause substitutions of copper. One was the use of stainless steel for ship propellers.)

This stability probably can be explained this way: Applications of brass and bronze castings are largely confined to those where their use is demanded. About 60 per cent of production is accounted for by ten industrial uses—journal bearings, plain bearings and bushings, plumbing fixtures and fittings, valves (except plumbing), railroad maintenance and supplies, pipe fittings (except plumbing), plumbing valves and specialties, industrial pumps, nonelectrical integrating meters and high voltage switchgear.

Competition from gray iron and malleable on one hand and aluminum on the other has kept brass and bronze foundries from increasing their production. But a secondary smelter in Cleveland believes another 10 per cent drop in copper prices would bring jobs back to the red-metal foundries.

Titan Puts Brass Mill in West

Brass rod and forgings will be produced by the $2.5-million plant Titan Metal Mfg. Co., Bellefonte, Pa., is building.

Completion of the 85,000 sq-ft building at Newark, Calif., is scheduled for next year.

CABRA surveys motordom and finds . . .

Copper Holds Its Own

THE FOUR-DOOR 1957 Buick Roadmaster has more than a hundred parts utilizing copper or its alloys. Total weight of the copper is about 53.7 lb.

Last year, some 180,000 tons of the metal, including alloyed forms, found its way to the automotive industry, reports the Copper & Brass Research Association (CABRA), New York. This means that each of the 8 million cars produced last year contained an average of 45 lb of copper, brass and bronze components, figures CABRA.

1957 Trends — During the first eight months of 1956, Chrysler Corp. used 15,000 tons. Its line of cars averages 42 to 45 lb per unit. One of its models, the four-door Plymouth Belvedere, has 175 parts made from copper or its alloys.

General Motors Corp.'s new Oldsmobiles average 33 lb, contain 50 parts. Of Chevrolet's 35.79 lb (1956 model), 28.67 lb go into standard equipment and 7.12 lb into accessories like the radio, heater and windshield wipers.

American Motors Corp. says its cars have an average of 32 lb of copper and copper alloy brass mill products, 9.5 lb of copper wire goods and 0.5 lb of copper and copper alloy foundry components and powder.

Some 1957 models will have more copper in them than ever before. Cadillac, for example, had 43 lb of copper, brass and bronze in its 1956 models, and expects to use more in 1957.

The metal is used in such components as brake cylinders, camshafts, carburetors, crankshafts, wiring, distributors, engine bushings and bearings, radiators and generators.

Aro Plans Expansion

A $2.5-million expansion program will provide separate facilities for straight-line manufacturing, processing, assembly, inventory control and production scheduling for Aro Equipment Corp.'s Aircraft, Air Tool and Lubricating Equipment divisions. The company's factory and offices at Bryan, O., will be enlarged by 60,000 sq ft in the next five years.

Carborundum Plans Growth

Plant expansion in 1957 and 1958 will cost Carborundum Co. $30 million—more than one-third of the company's record sales of $89,829,000 last year.

American Motors' 1957 Rambler: Average AMC auto contains 32 lb of copper

Warehouses Gain

Here's a survey that's billed as a first in the field: Who uses stainless steel?

IN 1946, 19.5 per cent of this country's stainless production went through warehouses to end users; today, the percentage is 31.4 per cent, say the American Iron & Steel Institute and American Steel Warehouse Association. The two organizations have completed a survey of stainless markets during the first half of 1956 (see table).

Average—The survey spells out the role played by warehouses: Their average order for stainless is 649.9 lb. Orders for 1000 to 9999 lb account for almost 50 per cent of total warehouse tonnage; from 10,000 to 99,999 lb, about 25 per cent; from 100 to 999 lb, about 20 per cent.

Warehouse tonnage exceeds mill tonnage in 14 of the 31 markets served. Examples of warehouse shipments by product classification: They sell 55.4 per cent of stainless steel plate and 57 per cent of stainless sheet.

Ranking—End uses of stainless are more diversified than previously thought, the survey reveals. Important percentages of shipments go to such consumers as: Restaurant and commercial equipment manufacturers (3.7 per cent); construction and building maintenance (7.9); aircraft (8.3); chemical equipment (2.2); pulp and paper processors (1.3); textile machinery makers (1.1); food and beverage equipment makers other than dairy (2); and fastener manufacturers (3.4).

The five top customers of mills are: Automotive; steel forgers, converters and redrawers; aircraft; electrical; household and cooking utensils. Top five warehouse customers: Aircraft; restaurant and commercial; fasteners; steel forgers, converters and redrawers; and chemical. (For first quarter report, see STEEL, Aug. 13, p. 139.)

• *An extra copy of this article and table are available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

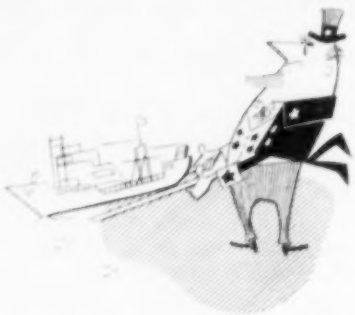
Guide to Stainless Steel Markets

(Net tons, first half, 1956)

	Mill shipments	Per cent of total mill shipments	Warehouse shipments	Per cent of total warehouse shipments	Total shipments	Per cent of total shipments
Consumer Products						
Automotive	50,585	20.2	2,299	2.0	52,884	14.5
Appliances	9,407	3.8	2,109	1.8	11,516	3.2
Utensils	10,165	4.1	548	0.5	10,713	2.8
Flatware	9,639	3.8	262	0.2	9,901	2.7
Furniture	1,482	0.6	563	0.5	2,045	0.6
Other	2,129	0.9	2,968	2.6	5,097	1.4
Total	83,407	33.3	8,749	7.6	92,156	25.2
Commercial & Professional Equipment						
Surgical, dental	760	0.3	1,484	1.3	2,244	0.6
Other scientific, professional	767	0.3	2,257	2.0	3,024	0.8
Restaurant, commercial	4,505	1.8	9,070	7.9	13,575	3.7
Total	6,032	2.4	12,811	11.2	18,843	5.1
Construction & Building Maintenance						
Plumbing, heating, air conditioning	4,709	1.9	2,285	2.0	6,994	1.9
Builders' hardware architectural, ornamental	4,855	1.9	4,398	3.8	9,253	2.5
Sheet metal shops	—	—	4,674	4.1	4,674	1.3
Other	3,697	1.5	4,209	3.7	7,906	2.2
Total	13,261	5.3	15,566	13.6	28,827	7.9
Industrial Machinery & Equipment, Other Industrial Uses						
Chemical	2,574	1.0	5,408	4.7	7,982	2.2
Oil & gas	2,491	1.0	1,869	1.6	4,360	1.2
Pulp & paper	631	0.3	4,069	3.5	4,700	1.3
Textile	531	0.2	3,381	3.0	3,912	1.1
Dairy	3,902	1.6	3,131	2.7	7,033	1.9
Other food, beverage	1,937	0.8	5,283	4.6	7,220	2.0
Electrical	11,166	4.5	3,720	3.2	14,886	4.1
Metalworking	5,612	2.2	4,700	4.1	10,312	2.8
Farm	480	0.2	455	0.4	935	0.3
Railroads	1,970	0.8	546	0.5	2,516	0.7
Shipbuilding	1,213	0.5	1,713	1.5	2,926	0.8
Fasteners	4,817	1.9	7,786	6.8	12,603	3.4
Containers, closures	1,796	0.7	1,018	0.9	2,814	0.8
Steel forgers, converters, redrawers	43,707	17.4	6,162	5.4	49,869	13.6
Aircraft	19,624	7.8	10,616	9.3	30,240	8.3
Ordnance	1,852	0.7	2,040	1.8	3,892	1.1
Other	14,544	5.8	15,079	13.2	29,623	8.1
Total	118,847	47.4	76,976	67.2	195,823	53.6
Export	11,795	4.7	520	0.4	12,315	3.4
Unreported	17,391	6.9	—	—	17,391	4.8
Total	250,733	100.0	114,622	100.0	365,355	100.0

Source: American Iron & Steel Institute, American Steel Warehouse Association

U.S. Tanker Programs Cause Many Problems



NEW TANKER programs are stirring up plenty of interest. To set the record straight, there are three areas to watch: 1. The 23 tankers already under construction or on order with U.S. yards, which are worth $223 million. 2. Proposa's for 31 tankers, totaling about 1.5 million deadweight tons, are now before the Maritime Administration, and would cost $390 million. 3. President Eisenhower's government program for 50 tankers (the others are privately owned), which has resulted from the Suez crisis. Plans of the tanker owners for the 31 ships call for completion within two or three years. With three of the ships in the 100,000-ton class, 11 above 45,000 tons and most of the rest in the supertanker class (over 30,000 tons), it brings up questions of where the plates are coming from. (See page 139.) In Ike's program, watch for a hassle between the Navy and the operators over the size of the ships: The Navy wants tankers small enough to operate out of any ports needed during an emergency; the operators want the super variety for economy of operation.

Plate Shortage: But No Controls

If a government tanker program would be approved, competition for plates would be fierce. It is estimated these 50 ships alone would take 750,000 tons of plates and another 250,000 tons of other steel products. Small wonder that controls on steel plates have been strongly urged by at least one government agency in recent weeks. So far, officials who will make the decision are sticking by their guns: No controls on any one commodity. The problem: If you give special treatment to one group or industry for hard-to-get materials, you're only opening the door for a flood of similar requests, and the situation would be as bad as ever.

And Quicker Action on Tax-Am?

One likely result of this threatened pinch on plates: Action on requests for fast tax amortization from the steel industry by the Office of Defense Mobilization may be speeded up. ODM reportedly has asked the Defense department for its next-year needs in advance of deadline, with the possibility good for a quick decision on new expansion goals for at least plate and oil country goods. It cou'd come before the first of the year, a development brought on by the Suez situation. Fast tax applications for most other steelmaking facilities probably will be turned down or shelved until after the first of the year. Applications for more than $2 billion are on file.

Government Research Up

Uncle Sam will spend about $2.7 billion in fiscal 1957 for research and development. That's 12 per cent above the 1956 figure and the upward trend is expected to continue. The Defense department does the lion's share of this work ($1728 million in 1957; $1696 million in 1956). Almost half of it is done in government facilities, but 38 per cent is handled by private firms and 19 per cent by educational institutions.

Antitrust Wants Authority

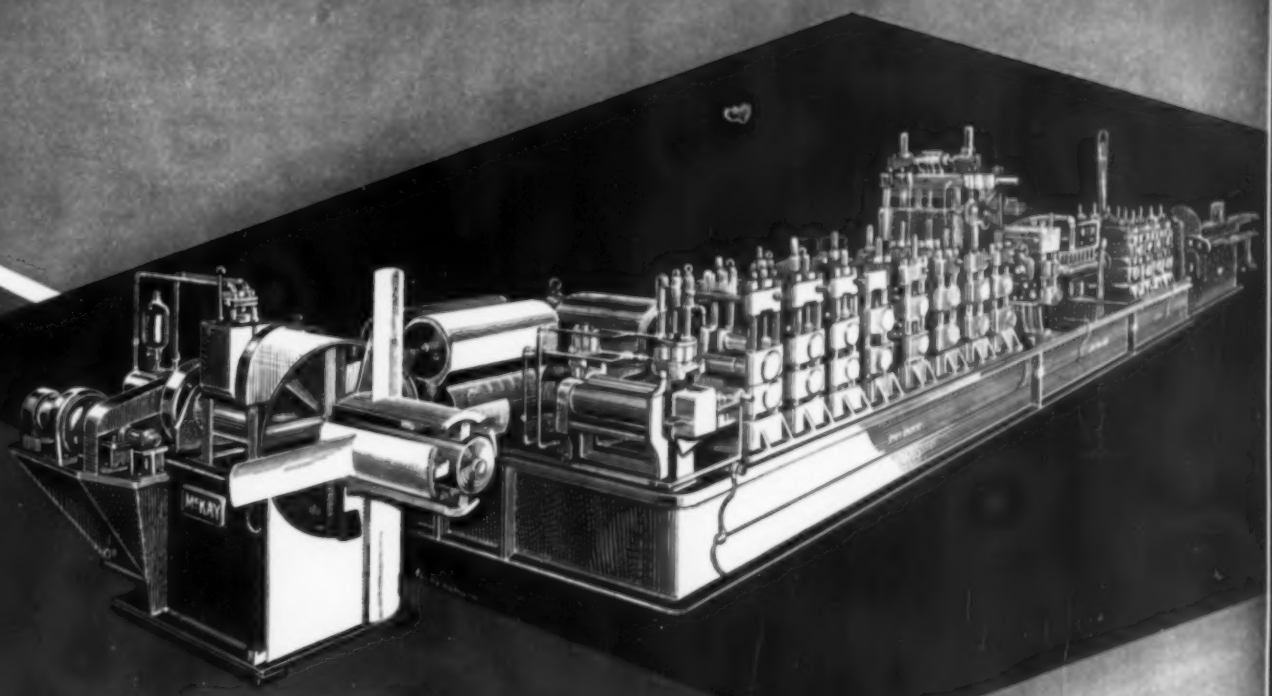
The Antitrust division of the Justice department will be one of the first at the door when the new Congress convenes in January. Wanted is authority to get information from businesses which is needed in the preparation of civil antitrust suits. Another request will be for required advance notification of intent to merge.

Deadline Extended

Firms now have longer to file applications for commercial exemptions and financial statements if their fiscal year ended on July 31 or Aug. 31, 1956. The deadline has been extended to Feb. 1 by the Renegotiation Board.

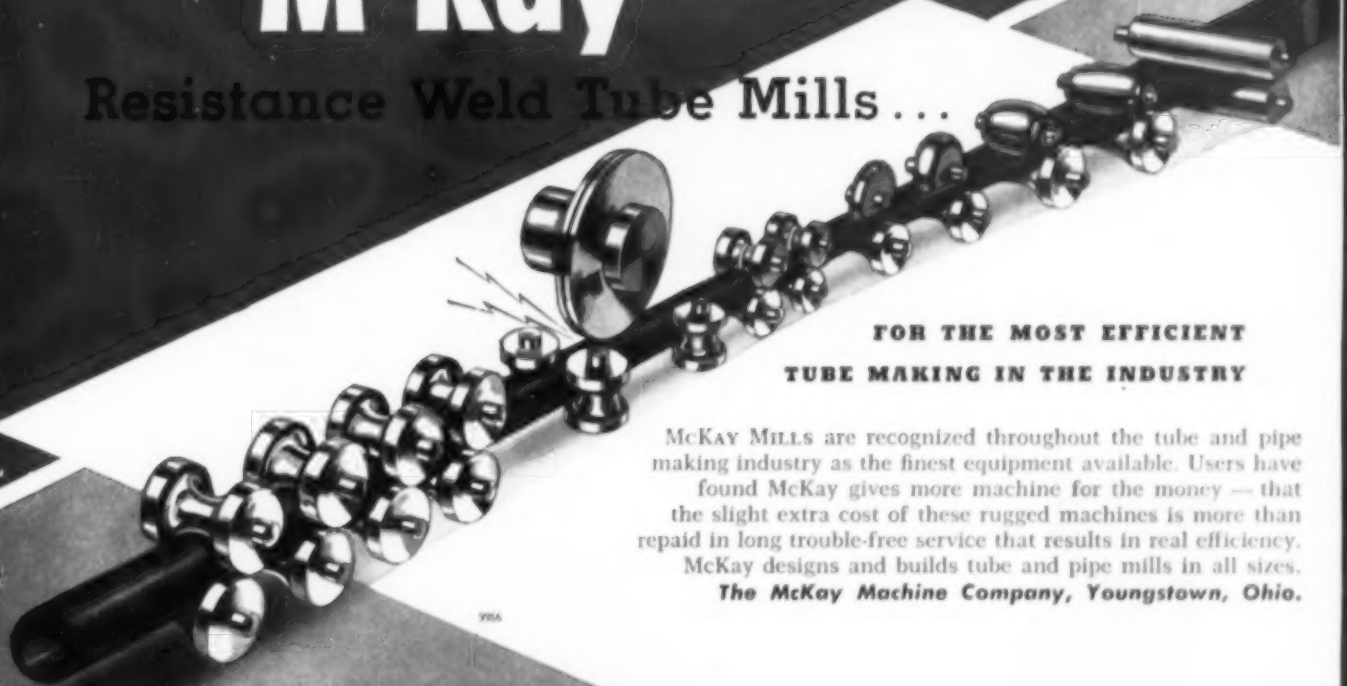
Straws in the Wind

- A nuclear-powered supertanker, if undertaken a year from now, could probably operate in the black, though it wouldn't necessarily be competitive, states Richard P. Godwin, project manager for the AEC-Maritime Administration nuclear-powered merchant ship. Six feasibility studies are under way to develop a nuclear power plant engineered specifically for merchant ship applications. Work on an experimental or prototype reactor is hoped for within a year.
- A task force is looking at federal procurement policies. Aim is to eliminate inconsistencies and to simplify government purchasing procedures to make it easier for small business to get a bigger share of government contract work.



McKay

Resistance Weld Tube Mills . . .



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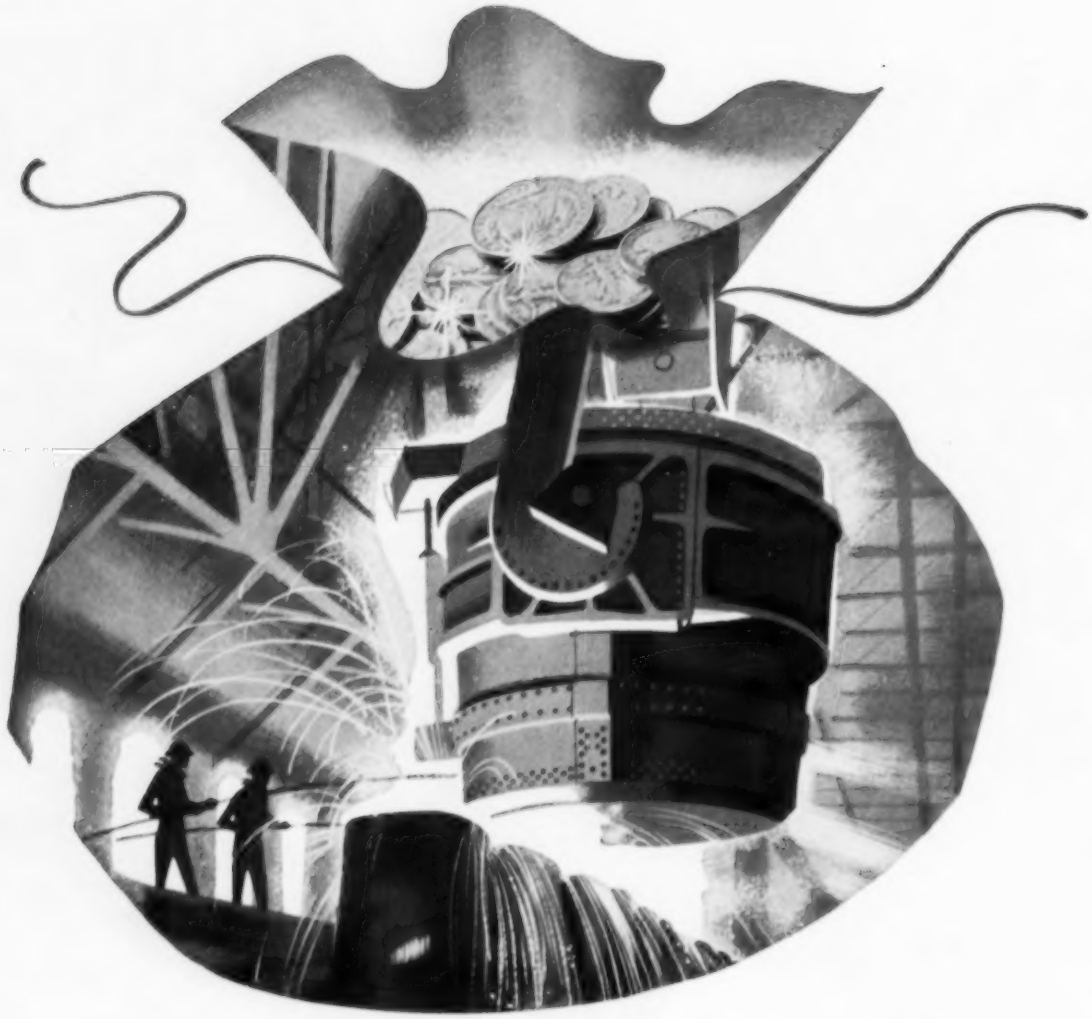

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Management at Work

Hauck Applies Chemistry to Steelmaking

"WE THINK, the chemical engineer is going to play an increasingly important role in steel production."

That's the unqualified prediction of Charles F. Hauck, vice president of Blaw-Knox Co.'s Chemical Plants Division, Pittsburgh. Mr. Hauck spends a lot of his time applying chemical engineering knowledge to steel industry problems.

Help Wanted—"Our job's pretty well cut out for us," he says. "As high-grade raw materials for steelmaking get scarcer, there's a bigger demand for more preliminary processing. That's where the process engineer steps in.

"Development work used to center on mechanical processing from pig iron to finished product. Now the emphasis is swinging to chemical processing at the pre-pig iron stage—back at the ore and other raw materials and coke by-products. It's a trend that is going to continue."

Service—Here's how the Chemical Plants Division serves steel: Seven big steelmakers and Blaw-Knox sponsored construction of a semi-commercial test plant in Niles, O., to reclaim sulphuric acid and iron oxide from spent pickle liquor. Using the Blaw-Knox-Ruthner process, the plant can regenerate 650 tons of waste sulphuric acid annually. It began operation in September.

The division designed and is building fertilizer facilities and a big plant for U.S. Steel Corp. at Provo, Utah, which will make ammonia and associated nitrogen compounds. The plant will transform sulphur from raw coke oven gas into sulphuric acid. It will extract hydrogen from the gas and combine it with nitrogen from the air to produce ammonia. It will oxidize the ammonia to nitric acid and neutralize it to form ammonium nitrate, a fertilizer.

Trends—While steelmakers are feeling the impact of this chemical research, the division has undergone some sweeping changes, too. "In the last two years, our division has done more business with the steel industry than at any time in our history," Mr. Hauck relates.

Blaw-Knox founded the division in 1939, mainly to serve the chemical industry. Now working for many other industries, it has 700 permanent technical and administrative personnel, which are backed by a field force of some 3000 men.

Mr. Hauck joined the division in 1951. (He had been a chemical engineer for 15 years after doing graduate work at Case Institute of Technology.) His philosophy for continued success in meeting steel's needs: "As in the waste pickle liquor project, the joint chemical-steel approach to steelmakers' problems is the best answer. We hope to see more of these projects in the future."

To get the most from your transportation dollar . . .

Traffic Managers Should:

1. **Direct both incoming and outbound shipments.**
2. **Help co-ordinate inbound material flow with production schedules.**
3. **Help co-ordinate shipments with production output.**
4. **Advise on packing and packaging.**
5. **Advise on material handling improvements.**
6. **Help co-ordinate distribution activities of warehouses.**
7. **Advise on new plant location.**
8. **Work with market research to determine proper pricing structure in potential markets.**

Let Traffic Managers Manage

Are you getting all you should from your traffic manager? His areas of responsibility are widening. It's up to top management to see that his value is recognized

SIX YEARS ago a Chicago metalworker took one month's transportation bills to a traffic consultant. "How can we cut our costs?" he asked.

Company officials had made some preliminary checks on their own. So they weren't too surprised when the consultant handed them recommendations which he estimated would amount to $120,000 in annual savings. The surprise came after a professional traffic manager was hired: Once his program went into operation, $1 million was slashed from the annual transportation costs of the company, its distributors and dealers.

Responsibility — Two important factors were involved. 1. The traffic manager was an expert—he knew shipping methods, routes, rates and classifications. 2. Top management gave him full responsibility for transportation in all phases of company activities, plus the authority to get action.

Point No. 2 is the source of the loudest complaints from traffic managers today: "We don't have sufficient authority to carry out good traffic practice in all its facets."

Previous to World War II, the transportation activities in the average company fell on a person of clerical status. In many cases, it was a side task for a buyer or salesman. Attempts at co-ordinating a traffic program were nonexistent. Since the war, rising transportation costs, plus increasing complexity in rate structures and commodity classifications, have emphasized the need for effective traffic programs.

Popular — Co-operation and co-ordination are the two most popular words in the traffic manager's vocabulary. Getting the most value for your transportation dollar takes close co-ordination between the traffic department and practically all other departments within the company (see check list). "And that requires co-operation," chorus the traffic managers.

At one Allis-Chalmers Mfg. Co. plant, for example, it was discovered that several production departments were ordering different items from the same geographical area. Each specified different delivery dates. A check on warehouse facilities, inventory control and production scheduling showed that with minor adjustments many shipments could be consolidated to take advantage of truckload rather than less-than-truckload rates. Savings: $170,000 annually.

Thomas Stewart, traffic manager for Zenith Radio Corp., illustrates the need: "In 1953, our transportation costs between Chicago plants and warehouses totaled $174,000. With better scheduling of incoming parts with production, we got the same job done in 1954 for $80,000. Demurrage costs, for example, dropped from $27,000 in

1953 to $1400 in 1954; car switching costs fell from $24,000 to $3200.

By studying its distributor and dealer ordering patterns and locations, Zenith has been able to save its distributors about $3000 per month in transportation charges by consolidating shipments.

Other Areas—Material handling methods, packaging and packing are other areas in which traffic managers can provide valuable advice. Is there a rate advantage in shipping or receiving materials on pallets or in containers? Could a more economical packaging method be used and still withstand normal shipping hazards?

Through his continuous contact with the traffic world and its constant change in rates and commodity classifications, the traffic manager is able to provide information to purchasing and sales departments on rate changes or impending changes which might affect their activities. He is also in a position to know the competitors' transportation costs.

Professionals—How big do you have to be to require the services of a professional traffic manager? There's no good rule-of-thumb, says Thomas Scanlon, a Chicago traffic consultant. It depends upon how big a factor transportation costs are in your operations and the variety of products you ship and receive.

Many firms retain an outside traffic specialist to handle all transportation activities, including route selection, bill auditing and payment, claim adjusting and shipment tracing. The Jennings B. Humphrey firm, which is in Chicago's Clearing Industrial District, handles the traffic activities for many firms in that area. Officials say their clients' transportation charges probably average between $50,000 and $100,000 monthly.

Some firms, including a few with traffic managers, make a practice of having their transportation bills audited periodically to make sure they're getting the best rates possible. This is a backstop against possible rate or classification changes that the person handling transportation in the company may not have known.

These auditing firms operate on a retainer basis or on commission —frequently 50 per cent of all charges they recover.

Caution — Select your auditing firm with care.

There are quick-buck practitioners who save you a dollar or two but can do much harm to your relationships with the transportation agents.

If you suspect you're not getting the most out of your transportation dollar, it's recommended that you get a 30-day service survey from a reliable consultant. Small firms can probably get this done for as little as $100.

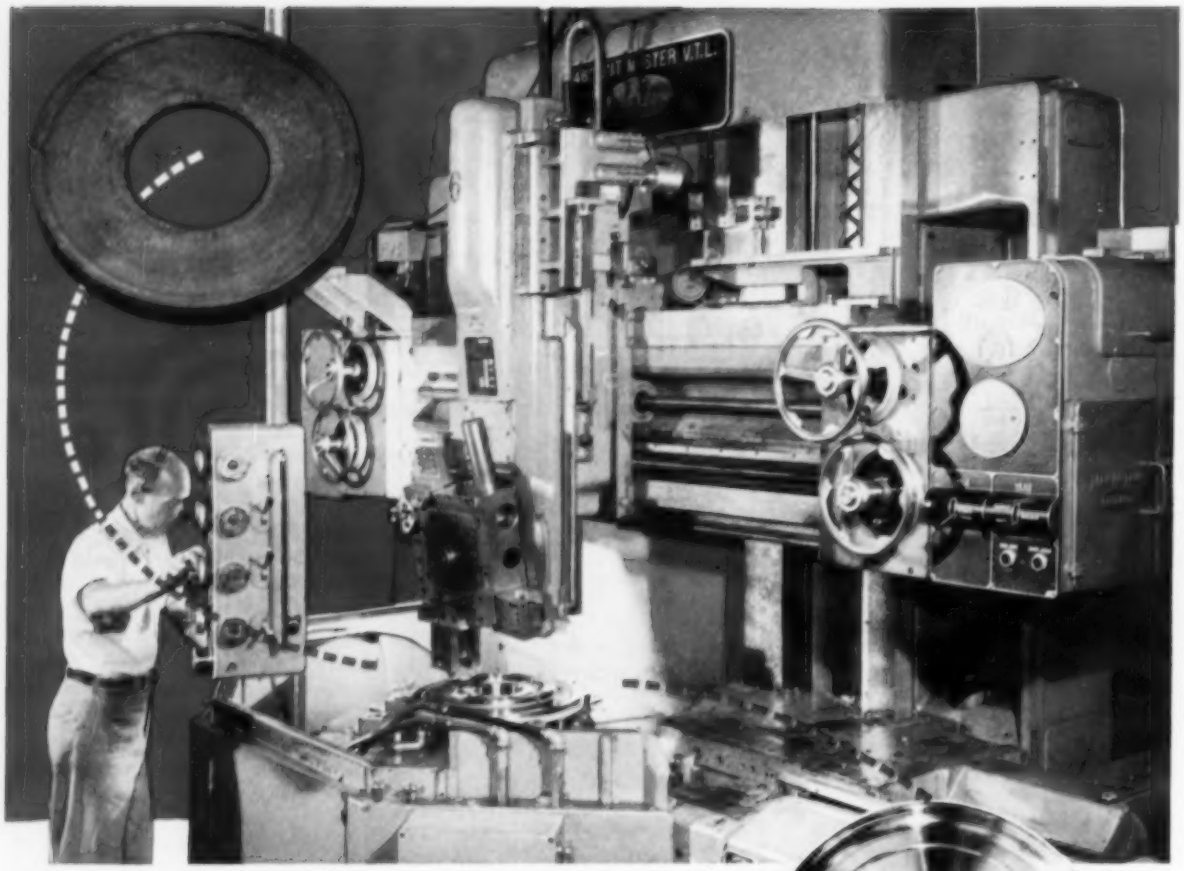
You'll get such questions answered as: Are my products properly classified so that I'm getting the best rate? Am I using the best type transportation? Would my transportation costs be reduced if I retained an outside specialist regularly? Would it be to my advantage to hire a traffic manager?

Find Them — Where do good traffic men come from today? Many have backgrounds in the traffic departments of railroads and truck lines as rate clerks. Crane Co., Chicago, requires all rate clerks it hires to have previous experience with rail or truck line rate departments.

In recent years, colleges and universities have recognized the need for transportation courses and offer such subjects. A few schools, including the University of Baltimore, Northeastern University, University of Minnesota, University of Texas and University of Pennsylvania, offer degrees in traffic management.

Night School—Also recommended by many traffic managers are the technical and trade schools like the College of Advance Traffic in Chicago. Says Dean W. J. Knorst: "We can teach in two years what it would take the average traffic man many years to learn in the average industrial traffic department." His college offers full day-time courses, part-time evening courses and correspondence courses. About 95 per cent of its enrollment is made up of persons already working in industry—many in traffic departments whose companies pay tuition expenses.

** An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



"To produce quality parts in quantity . . .

Nothing beats Man·Au·Trol"

This statement by Mr. W. Mason Williams, Manufacturing Manager of the Jet Division, Thompson Products Inc., Cleveland, Ohio, is based on ten years of experience with Man-Au-Trol.

"If it hadn't been for Man-Au-Trol" Mr. Williams continues, "we would still be turning out aircraft engine components on manually-operated machines. Man-Au-Trol, particularly when tooled with better cutting tools, has enabled us to turn out at least *five times as many compressor disc and turbine discs per shift* as we produced on hand-operated equipment."

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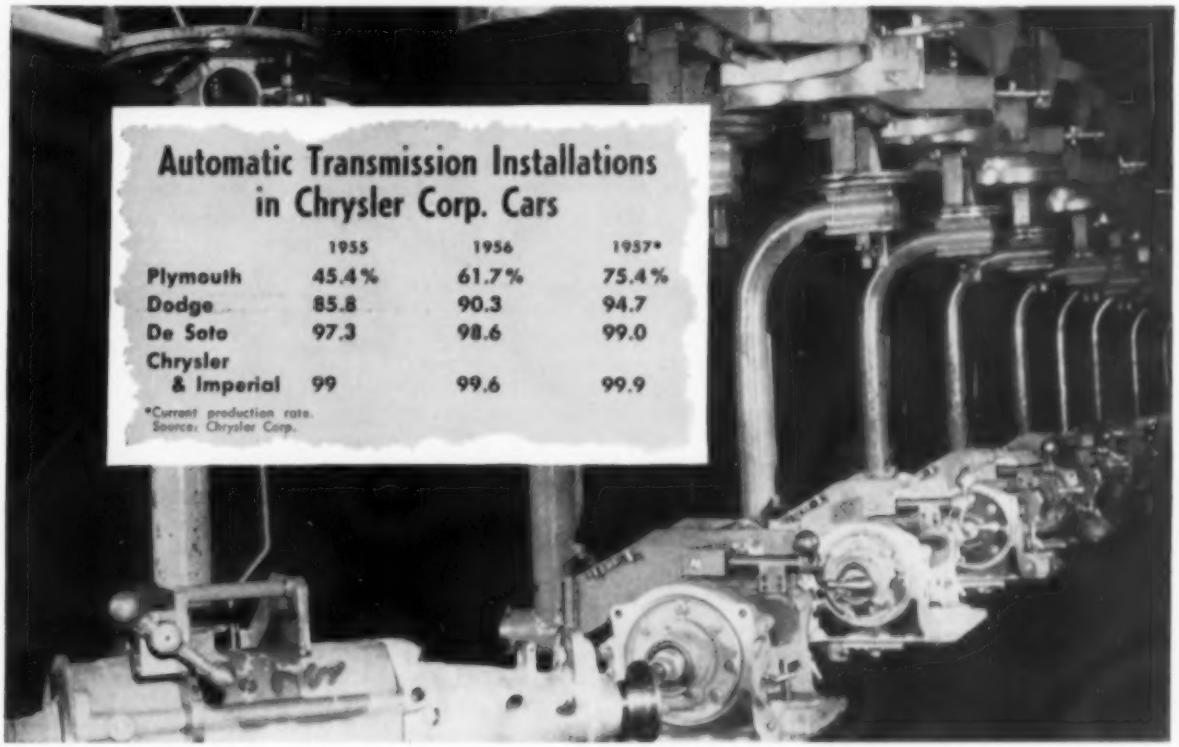

Automatic Transmission Installations in Chrysler Corp. Cars

	1955	1956	1957*
Plymouth	45.4%	61.7%	75.4%
Dodge	85.8	90.3	94.7
De Soto	97.3	98.6	99.0
Chrysler & Imperial	99	99.6	99.9

*Current production rate.
Source: Chrysler Corp.

Automation for Automatics

Chrysler's automatic transmission plant at Kokomo, Ind., is the last word in modern design; but plant engineers are already thinking of changes to be made

COMPANIES faced with the problem of machining and assembling different types of parts made from several different materials would do well to check Chrysler Corp.'s automatic transmission plant.

Highlights — James R. Cypher, plant manager, explains that the 684,000 sq-ft plant is divided into three basic areas to handle steel, cast iron and aluminum parts. Operations include machining, heat treating, finish grinding, final assembly and testing.

More than 1150 machine tools are hooked together in different sequences of automated production. Altogether, 319 major parts and 422 minor parts are machined, checked and assembled into finished transmissions.

Dispose-All — A 1.5-mile long flume system runs beneath the plant. Chips from machined parts are washed into the system by the machining coolant. Additional coolant carries them into a clarifying station where the chips automatically are conveyed into railroad cars.

The coolant is cleaned and pumped back to the lines. Each section of the plant has it's own clarifier so aluminum, steel and gray iron chips won't be mixed.

Another underfloor rake-type conveyor layout disposes of cast iron borings and turnings in the same way. Bill Miron, manufacturing manager, figures 1 ton of borings and turnings are produced each hour. About 48 tons of scrap is produced in an 8-hour shift. Current transmission output is about 1600 per shift.

Aspirin Please — Borings and turnings pose one small headache for Mr. Miron right now. "They keep jamming up on the conveyor, and we have to have a man on duty to clean it out. If I had to do it over, I'd install a pan-type conveyor," he remarks.

Aside from this minor problem, Mr. Miron is enthusiastic about plant layout. "Most of our machines are set right over the flume system. If we want to expand, all we have to do is move the machines to each side and run a short

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lead-in to the chip flume. We can double our capacity that way," he adds.

While Chrysler officials report no such immediate plans, some changes undoubtedly will be made before long. One switch may increase aluminum operations if the company goes to an aluminum transmission case, as has been rumored. The case is now a gray iron casting.

Desegregated — Case machining is a good example of Chrysler's automation aims. Two duplicate lines are each over 600-ft long, have 36 transfer machines and a total of 276 stations.

With the exception of one hand grinding operation on the valve body face and some hand deburring on hard-to-reach spots, the case line is completely automated. (Mr. Cypher points out the Kokomo facility employs 2300 persons, almost a third more than Chrysler's former transmission plant in Kokomo which had similar production quotas.)

Perhaps the most interesting feature about the case line is the fact that it is a wet machining setup, explains Mr. Miron. Elsewhere in the industry, similar machining usually is done without liquid coolants. Chrysler figures it saves a quarter of a million dollars with the wet line because it does away with the need for an expensive dust collection system.

Odds and Ends—Several other items in the plant stand out as examples of Chrysler's effort to make the Kokomo installation a model layout. Bruce Fields, production engineer and plant tooling expert, reports that 75 per cent of the plant's single bit cutters use throwaway tools. He credits the throwaways with greatly reducing machine down time and simplifying tool changes.

Mr. Miron points out the in-line heat treating unit for small parts uses a high temperature (over 400° F) quenching oil. "We don't use quenching dies because we find they mean more part handling and sometimes lead to part distortion," he says.

The final assembly line is humidity controlled. Positive air pressure is maintained to keep out dirt. Plant engineers explain it's just as good and a lot cheaper than air conditioning or blower systems.

Output—The end product of this activity is Chrysler's three-speed Torqueflite transmission which is standard on De Soto Fireflites, Chrysler Saratogas, New Yorkers and Imperials. It will vie with the Powerflite as optional equipment on other Chrysler cars.

Biggest improvements on Torqueflite over Powerflite are a third speed range, simplified mechanical linkage and a combination neutral and starting button.

The Kokomo plant currently has 65,000 Torqueflites on hand. Management wants to reduce this inventory at a rate of 15 per cent per month. Barring strikes, it seems apparent that Chrysler car output won't be held up by lack of transmissions.

AC Looks Ahead

Auto industry sales of replacement parts are running 10 to 20 per cent ahead of those in 1955's record year, says Joseph A. Anderson, general manager, AC Spark Plug Division, General Motors Corp., Flint, Mich. He looks for similar increases in '57. AC is building an additional 225,000 sq-ft plant in Milwaukee to handle the load.

Hugh Curtis, AC's works manager, elaborates on Mr. Anderson's predictions by explaining that AC serves more than GM in the accessory field. "In 1956, only one-third of our business was original equipment for GM cars. Another third went into the replacement market and the other third is defense business."

Trends — Eying the future accessory market, Martin Caserio, AC's chief engineer of auto products, emphasizes lighter materials will be used in items like oil filters and batteries.

He adds that another trend is the substitution of smaller and simpler instruments for traditional checking devices like dip sticks in transmission cases and oil pans. Instruments installed on the dash also will indicate water levels in the battery or radiator.

"When engine designers get around to bringing out a power plant with 12:1 compression ratio, we'll have plugs ready for it," asserts Mr. Caserio. He indicates the plugs are out of the design stage and waiting for the proper engine. Other sources already have hinted that such engines are under development.

U.S. Auto Output

	Passenger Only 1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804	659,763
August	401,996	614,493
September	190,709	461,591
October	388,922†	517,813
10 Mo. Total	4,622,918†	6,510,814
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Oct. 20	88,557	137,425
Oct. 27	104,269	158,430
Nov. 3	117,583	167,278
Nov. 10	132,087	180,754
Nov. 17	138,405†	179,250
Nov. 24	115,100*	151,799

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.

Hurley Outlines S-P Aims

Studebaker-Packard Corp., South Bend, Ind., has three aims: 1. To stop losing money. 2. To make a profit. 3. To diversify its product structure.

That's the word from Roy T. Hurley, chairman of Curtiss-Wright Corp., Dayton, O. C-W has a tight management advisory contract with S-P. So far, plans to bail out the auto maker are running on schedule, he adds.

Mr. Hurley also scotches talk (for the present at least) that his company wants to merge Studebaker-Packard into the aircraft firm. "There may be a merger of other interests into Studebaker-Packard before any action on a merger of S-P into Curtiss-Wright," he announces.

Tooling funds for 1958 Studebaker and Packard cars already have been allocated. Some tooling is in the works. A final tip from Mr. Hurley: "As far as the future is concerned, we're not going to look for defense contracts to support the automobile business."

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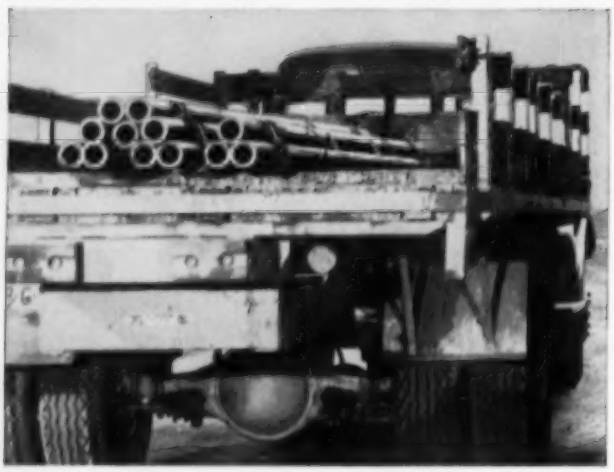

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YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

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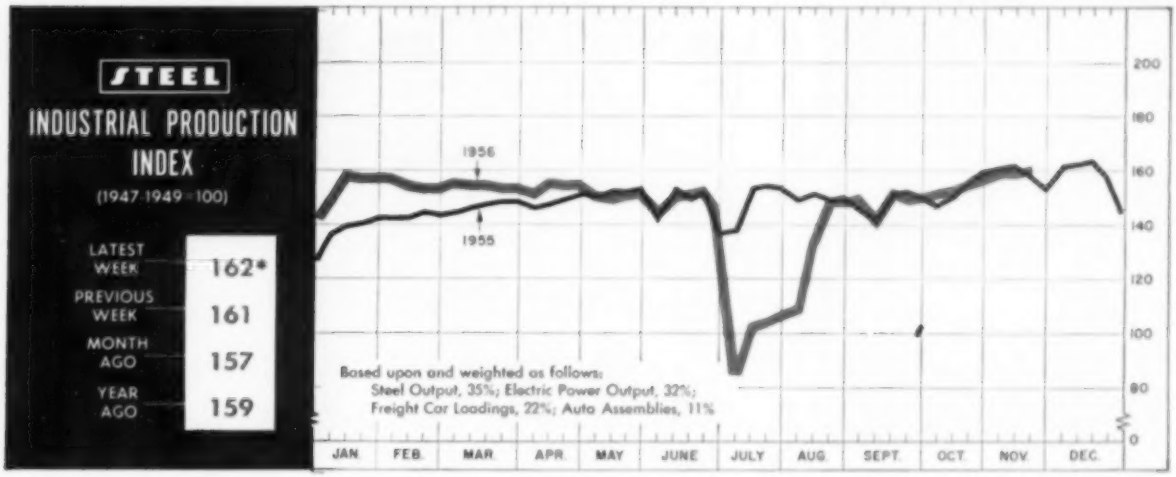

*Week ended Nov. 17.

Industrial Activity Maintains Fast Pace

INDUSTRIAL production is perched on a record level for the second month in a row, and it shows no signs of giving up that lofty position.

The Federal Reserve Board estimates that the nation's industries in October were operating 45 per cent above the 1947-1949 level. That's 1 percentage point better than the record set in December, 1955, and equal to the revised mark posted for September. It's also the figure most economists have estimated as the fourth quarter average. There are several reasons to believe this estimate will be changed upward.

Correlation — Reason No. 1 is found in STEEL's industrial production index above. Historically, this correlates closely with the FRB index. Thus, the October weekly average of 156 (1947-1949=100) compares with the September average of 155, indicating the Reserve Board's preliminary October figure will stay at the present level. STEEL's index has climbed steadily to an average of just below 162 for the first three weeks of November. Thanksgiving will take the edge off the fourth week, but the FRB figure will be seasonally adjusted to account for that. Industrial production appears to be headed toward 146, or higher, in November.

Reason No. 2 is that Detroit is stepping up production to six days a week where possible to satisfy mounting dealer pressure for more cars. Strikes at supplier's plants are playing hob with motordom's scheduling, but production is expected to show weekly improvement until the peak is reached in December.

Reason No. 3—The normal seasonal trend portends production records. December set the peak in both 1954 and 1955. There is no reason to believe that 1956 will see any change in this pattern.

Construction Up in '57

Even though the construction industry is showing some signs of

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,458	2,466	2,416
Electric Power Distributed (million kw-hr)	11,520[1]	11,522	11,149
Bituminous Coal Output (1000 tons)	10,160[1]	10,525	9,874
Petroleum Production (daily avg—1000 bbl)	7,000[1]	7,050	6,851
Construction Volume (*ENR*—millions)	$369.9	$281.0	$401.7
Auto, Truck Output, U. S., Canada (*Ward's*)	169,977[1]	162,131	213,468
TRADE			
Freight Car Loadings (1000 cars)	765[1]	772	772
Business Failures (Dun & Bradstreet)	219	271	207
Currency in Circulation (millions)[3]	$31,141	$30,964	$30,794
Dept. Store Sales (changes from year ago)[3]	−3%	−3%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,638	$19,987	$20,145
Federal Gross Debt (billions)	$275.0	$275.0	$279.7
Bond Volume, NYSE (millions)	$24.1	$15.8	$17.7
Stocks Sales, NYSE (thousands of shares)	10,044	9,147	12,430
Loans and Investments (billions)[4]	$85.6	$85.7	$85.3
U. S. Govt. Obligations Held (billions)[4]	$25.8	$26.0	$30.0
PRICES			
STEEL's Finished Steel Price Index[5]	225.92	225.92	208.90
STEEL's Nonferrous Metal Price Index[6]	257.0	255.7	265.1
All Commodities[7]	115.6	115.4	111.2
Commodities Other Than Farm & Foods[7]	123.9	123.6	119.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,895; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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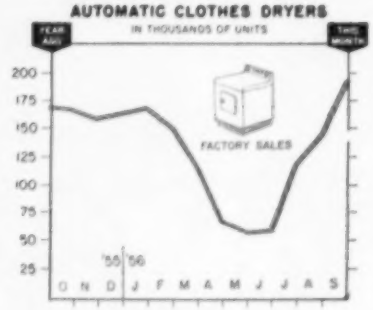
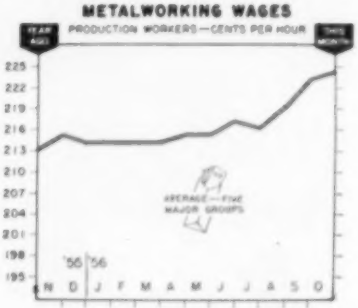
THE BUSINESS TREND





Factory Sales—Units	1956	1955	1954
Jan.	166,243	115,383	82,195
Feb.	148,522	109,215	62,488
Mar.	113,031	113,498	51,796
Apr.	64,923	73,978	37,661
May	55,330	49,228	26,533
June	58,441	70,616	36,297
July	117,548	60,516	40,755
Aug.	144,537	136,190	80,165
Sept.	192,724	169,905	107,084
Oct.	.....	166,889	122,182
Nov.	.....	157,153	138,254
Dec.	.....	161,823	115,341
Totals	.....	1,384,394	897,751

American Home Laundry Mfrs. Assn.
Charts copyright, 1956, STEEL.

1955	Prim. Mtls.	Fab. Prod.	Machinery	Elec. Mchy.	Trans. Equip.
Oct.	231	203	213	191	227
Nov.	231	203	215	191	231
Dec.	232	202	216	192	228
1956					
Jan.	233	203	217	193	225
Feb.	232	202	217	193	224
Mar.	232	203	217	194	225
Apr.	233	204	218	196	226
May	233	204	218	196	226
June	234	206	219	197	228
July	227	206	220	198	229
Aug.	236	207	221	199	232
Sept.*	241	211	225	201	236
Oct.*	242	212	225	202	239

*Preliminary.
U.S. Bureau of Labor Statistics

slowing down for the winter, it is looking beyond this period to bigger and better things in 1957. F. W. Dodge Corp. predicts that dollar volume of construction contract awards in 1957 will set a record 7 per cent above the 1956 total. This year is expected to close out at almost $25.1 billion, and 1957 will come close to $26.8 billion (in 37 eastern states).

The Dodge organization adds its voice to the growing feeling of confidence regarding residential building. It predicts a slight increase in housing starts next year —up from 1.1 million in 1956 to 1,125,000. Dollar volume will increase about 6 per cent because of rising construction costs, but floor space will remain level, reflecting a reversal of the current trend toward larger homes.

All across the board, Dodge sees dollar volume increases running substantially ahead of physical volume. Total building contracts will amount to about $20.4 billion, 6 per cent more than this year's, but floor space will advance only 1 per cent.

Contract awards in 37 eastern states during October totaled $1,706,406,000, a decrease of 8 per cent, compared with the corresponding month last year. Dodge reports the first ten months of 1956 are still 6 per cent ahead of the 1955 period.

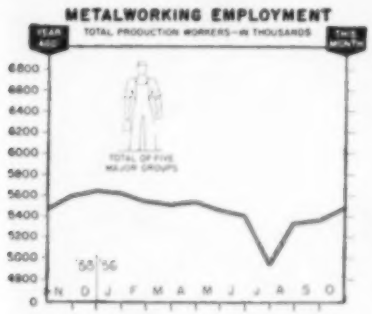
Home Laundry Sales Gain

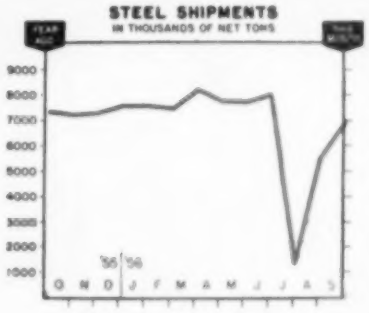
While some soft spots have shown up in the appliance market this year, home laundry equipment is sailing along at the fastest pace in the industry's history. Factory sales for September amounted to 601,103 units, says the American Home Laundry Manufacturers' Association. That's a record for September or any other month.

Automatic clothes dryers (see chart, above) led the way with an increase of 33 per cent over August and 13 per cent over September, 1955. Washer sales, while up 8 per cent above August's, slipped 3 per cent below the year-ago figure. For the first nine months of this year, total home laundry appliance factory sales are 8 per cent ahead of the 1955 pace.

MHI Predicts Record Year

Industrial activity in the U.S. in 1957 will continue to set rec-





1955	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Oct.	1,118	921	1,206	880	1,344
Nov.	1,133	932	1,225	866	1,446
Dec.	1,141	928	1,250	888	1,471
1956					
Jan.	1,141	913	1,261	854	1,449
Feb.	1,138	899	1,274	849	1,392
Mar.	1,130	893	1,281	842	1,354
Apr.	1,136	895	1,292	874	1,332
May	1,117	881	1,281	872	1,295
June	1,118	870	1,278	866	1,269
July	743	825	1,254	854	1,250
Aug.	1,091	864	1,257	877	1,235
Sept.*	1,120	887	1,261	892	1,190
Oct.*	1,127	907	1,267	909	1,267

*Preliminary.

U.S. Bureau of Labor Statistics.

	Net Tons		
	1956	1955	1954
Jan.	7,587,870	6,009,958	5,727,600
Feb.	7,468,393	6,119,900	5,364,978
Mar.	8,255,824	7,268,795	5,583,660
Apr.	7,783,873	7,279,321	5,287,972
May	7,764,776	7,540,889	5,423,168
June	8,077,805	7,770,213	5,887,488
July	1,288,988	6,250,597	4,490,179
Aug.	5,539,915	7,053,615	4,681,242
Sept.	7,058,028	7,378,247	5,004,222
Oct.	.....	7,216,821	5,035,384
Nov.	.....	7,247,994	5,240,209
Dec.	.....	7,580,943	5,448,649

American Iron & Steel Institute.

ords if the prediction of the Material Handling Institute comes true. It says material handling equipment sales next year will be 10 per cent higher than the record breaking total this year. This is a good bellwether industry to watch because it serves practically all other industries.

MHI directors point to four major contributing factors as the bases for their optimism:

1. Material handling still offers the greatest opportunity for reduced cost and increased productivity.

2. Automation places greater demands on handling systems to move materials to and from manufacturing processes.

3. Use of unit loads in handling, storing, shipping and receiving of materials is increasing.

4. Cost of manual handling is increasing and the supply of labor is decreasing.

The institute says other conditions influencing the outlook for 1957 are unsettled conditions in foreign countries, continued capital equipment spending programs and the federal highway program.

Bookings for 1956 will be about 25 per cent higher than the record number last year.

Trends Fore and Aft

• If the electrical manufacturing industry is going to have the research and expansion programs needed to keep pace with demands for its products in the next ten years, it must have higher prices and bigger profit margins, says Ralph J. Cordiner, president of General Electric Co.

• Primary prices leveled off in October. The Bureau of Labor Statistics reports its wholesale price index for October was 115.5 (1947-1949=100), the same as the revised figure for September. In October, 1955, the index registered 111.6.

• Freight car deliveries increased to 5666 during October, compared with 3444 in September. New orders also increased—from 3949 in September to 6532 in October. On Nov. 1, the backlog of orders stood at 122,250 cars.

• After dipping to 9583 in September, the number of new business incorporations zoomed 20.5 per cent to 11,546 in October, reports Dun & Bradstreet Inc. There were 120,238 incorporations during the first ten months of this year, compared with 139,651 for all of 1955.

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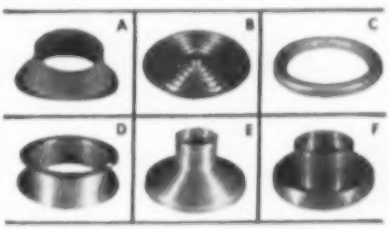
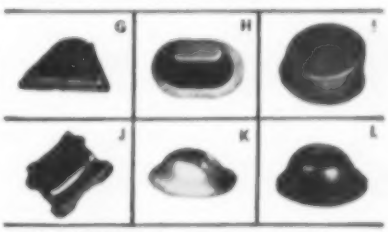


METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.



HYDROFORMING:
Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

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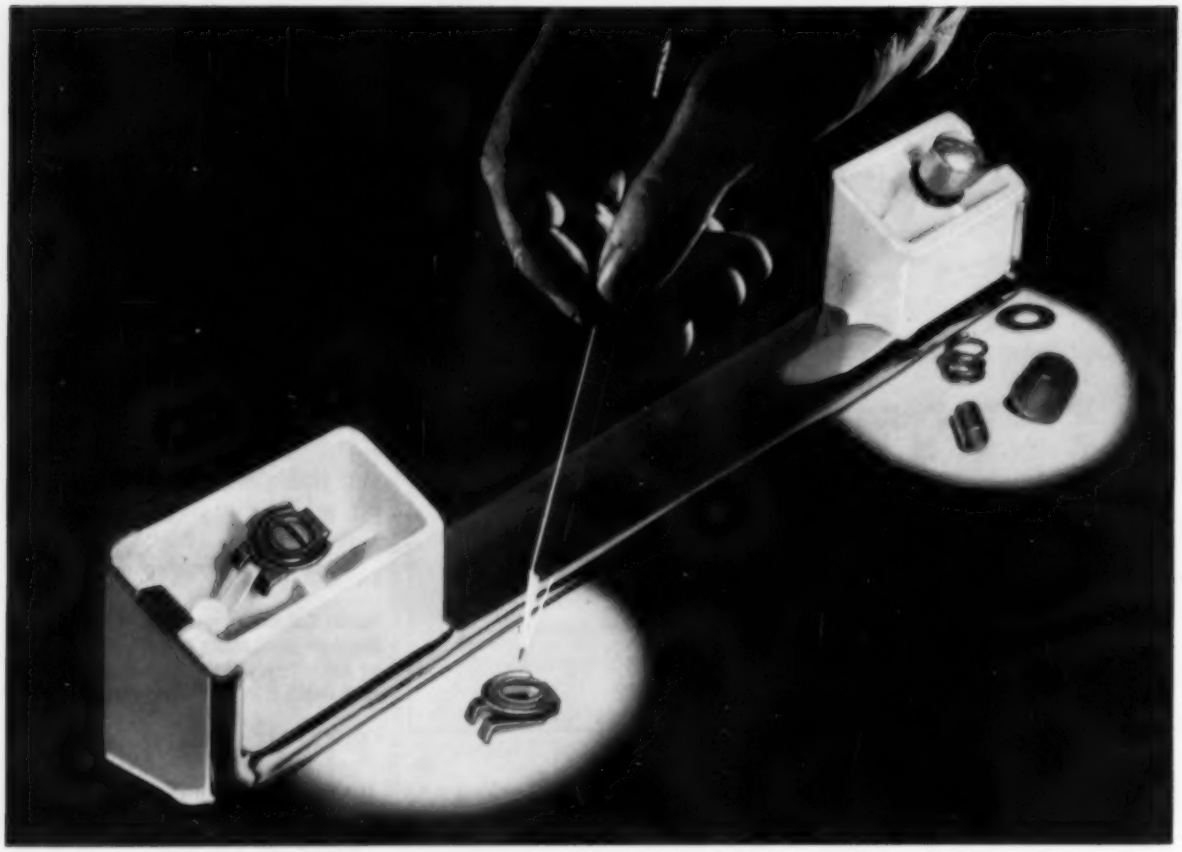

Engineered by Tinnerman...

One-Piece SPEED CLIP® replaces 4-part fastener, helps assembly and shipping... and saves money!

Four separate parts plus screw were required to fasten each end of the removable door handles on kitchen ranges manufactured by the Caloric Appliance Corporation, Topton, Pennsylvania.

Tinnerman fastening specialists teamed up with Caloric designers to eliminate 3 of the parts!

Now . . . a special one-piece, multi-purpose SPEED CLIP plus screw do the same job more efficiently and at lower cost, and reduce small parts handling. Faster, easier assembly . . . fewer parts to buy, inventory and handle. Packed inside the oven for safe shipment with SPEED CLIPS in place, the door handles are dealer-applied in far less time, can be easily removed by the housewife for cleaning.

The resiliency of the spring steel SPEED CLIP prevents crazing or chipping, enables it to absorb varying panel thicknesses and porcelain enamel build-up. Changeover was made without retooling or redesigning door handle or keyhole-shape mounting holes.

Find out now where SPEED NUT brand fasteners belong on your assembly line. There are more than 8000 variations to choose from. Call your Tinnerman representative for complete details and write for our Fastening Analysis Bulletin No. 336.

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Canada: Dominion Fasteners, Limited, Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Limited, Treforest, Wales. *France:* Simmonds, S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

TINNERMAN

Speed Nuts

FASTEST THING IN FASTENINGS®

W. D. NIXON
Aro Equipment purchasing agent

SAMUEL C. CLARKE
Chambersburg Eng. sales mgr.

E. C. SARGENT
Zirconium Corp. of America president

W. D. Nixon was made purchasing agent for the lubricating equipment and air tool divisions of **Aro Equipment Corp.**, Bryan, O., and temporarily for the aircraft division.

J. Vincent Mahoney was made general superintendent of the Niles, O., branch, **Truscon Steel Division**, Republic Steel Corp. He was a superintendent at the Youngstown plant.

Acoustica Associates Inc., Glenwood Landing (L. I.), N. Y., elected **Paul M. Platzman** vice president of sales and manufacturing; **Harold P. Baker**, vice president-treasurer; **Ralph Reynolds**, technical sales manager.

Kenneth M. Wilhelms was named superintendent, Laclede Works, **Laclede-Christy Co.**, division of H. K. Porter Company Inc. at St. Louis.

Charles E. Bulloch fills the new post of director of product development for **A. O. Smith Corp.**, Milwaukee. He was special assistant to F. S. Cornell, executive vice president.

Howard A. Reid was appointed executive assistant to the vice president-sales, **Walworth Co.**, New York.

John E. Lane was made Detroit district sales manager, Fastex Division, **Illinois Tool Works.**

Samuel C. Clarke was appointed manager of sales at **Chambersburg Engineering Co.**, Chambersburg, Pa.

Edward H. Jacobs was appointed works manager, **Abrasive Machine Tool Co.**, East Providence, R. I. He will supervise production of the firm's line of precision surface grinders. He was manufacturing manager for Paragon Gear Works Inc.

Roscoe O. Bonisteel Jr. was elected president, **Morton Bearing Co.**, Ann Arbor, Mich. He succeeds **Hudson T. Morton**, who has sold his stock interest in the firm and resigned as president and general manager.

Henry Laevsky was made general manager of the new hermetic seal division of **Phillips Control Corp.**, Joliet, Ill.

American Engineering Co., Philadelphia, appointed **Fred R. Callowhill** sales manager of its power plant division; **Vernon A. Olson**, sales manager of its marine and hydraulics division.

E. Clyde Grimm was elected executive vice president, **Samuel G. Keywell Co. Inc.**, with headquarters in Pittsburgh. **Tom J. McGrath Jr.** was named vice president in charge of the Cleveland office; **Stanley B. Amidon**, vice president in charge of the New England office in Worcester, Mass.

E. C. Sargent was appointed president, **Zirconium Corp. of America**, Solon, O. Mr. Sargent joined the firm in February as vice president-general manager and now succeeds **N. V. Coyle**, who remains as chairman.

George T. Fox was appointed president and executive officer of **Reynolds Mfg. Co.**, Springfield, Mo.

American Motors Corp., Detroit, elected **B. A. Chapman** executive vice president-general manager, appliance division; **Roy D. Chapin**, executive vice president-general manager, automotive division; **E. W. Bernitt**, vice president-operations, automotive division. **C. T. Lawson** becomes vice president on the president's staff.

John E. Spears, vice president in the gas and coke division of **Koppers Co. Inc.**, was elected vice president-general manager of the division, with headquarters at the Kearny, N. J., plant. He also was appointed regional representative, eastern district, for the company.

Aluminum Industries Inc., Cincinnati, elected **Robert E. Hater** vice president in charge of original equipment sales. **Scott M. Kennedy**, director of sales, parts division, was elected vice president in charge of the division. **H. S. Riley** was made sales manager, Permite parts sales. He was sales manager of Toledo Steel Products

Co., division of Thompson Products Inc.

Canadian Monorail Co. Ltd., Gault, Ont., elected **Quigg Lohr** president; **A. S. Wrobleski**, vice president-sales; **Earl W. Balke**, plant manager. New officers of **Landahl Conveyor Co.**, subsidiary at Lakewood, O., are: **C. L. Fell**, president; **C. E. Barner**, vice president.

John M. Tome was appointed to direct market research and product planning for **General Electric Co.'s** chemical materials department, Pittsfield, Mass.

A. B. Vestal was named planning engineer - plant development division for **Jones & Laughlin Steel Corp.**, Pittsburgh.

Hiram J. Cameron was elected vice president and controller, **Overland Steel & Iron Corp.**, Riverside, Calif.

John J. McNutt was named production supervisor and plant manager, **Morgan Machine Works Inc.**, San Diego, Calif.

Russell K. Reichelderfer and **Robert N. Richardson** were named administrative assistants in the office of operating administration, **Armco Division**, Armco Steel Corp., Middletown, O. **William Verity** was made assistant to the administrative vice president.

Furane Plastics Inc., Los Angeles, appointed **J. C. de Graaf** sales manager, coatings division.

John L. Bricker, **Robert L. Evans** and **William E. Mahaffay** were elected vice presidents of **Whirlpool-Seeger Corp.**, St. Joseph, Mich.

Paul J. Morga was appointed general manager of the Elmira, N. Y., office of **R. C. Neal Co.**

Kennedy Valve Mfg. Co. appointed **Jack W. Skinner** west coast branch manager with offices in San Francisco.

W. L. Maxson Corp. appointed **F. D. Vieth** western district manager with offices at Beverly Hills, Calif. He was manager of air-borne products in New York. **James A. Lowery** was named to assist Mr. Vieth.

JULIUS J. DOMONKOS

ROY J. SANDSTROM

head new operating groups at Bell Aircraft

Bell Aircraft Corp. reorganized its Niagara Frontier operations (Buffalo-Niagara Falls, N. Y.) into two operating groups. Vice President **Julius J. Domonkos** was made general manager - aircraft division; Vice President **Roy J. Sandstrom**, general manager-weapon systems division. **Norman A. Lomas** was made purchasing agent-aircraft; **M. J. Coughlin**, director of procurement-weapon systems. **Raymond C. Sears** is director of quality control - aircraft; **John T. Bailey**, weapon systems. Subdivisions of the weapon systems division are headed by: **John H. van Lonkhuyzen**, avionics; **Jesse H. Zabriskie**, guided missiles; **John F. Strickler Jr.**, research; **William M. Smith**, rockets.

George A. Most Jr. was made Boston district manager, **Link-Belt Co.** He is succeeded as district manager at Moline, Ill., by **J. Charles Bullock**. **Gene A. Zwerner** was made district manager, Albany, N. Y., and **C. C. Wiley** district manager at Washington.

F. E. Loeffler was made manager-sales promotion for **Electro Metallurgical Co.**, a division of Union Carbide & Carbon Corp., New York.

Inland Steel Container Co., Chicago, appointed **Richard J. Nelson** to the new post of assistant to the vice president-operations. He was assistant manager-industrial relations for the parent firm, Inland Steel Co. **Leonard M. Ansley**, former director of purchases, was promoted to plant manager at Cleveland.

Charles L. Fuelling joins the technical sales staff of **Diamond Alkali Co.'s** chromium chemicals division, with headquarters at the Diamond Research Center, Painesville, O.

Neil R. Dewar was made manager of the Los Angeles food container plant of **Foil Kraft Division**, Kaiser Aluminum & Chemical Corp.

Lloyd G. Depner was made assistant manager, Cleveland district sales, **American Steel & Wire Division**, U.S. Steel Corp. He succeeds **Reid C. Pierce**, retired.

Roger J. Cesvet was named to head research and development for the building products division of **American Welding & Mfg. Co.**, Warren, O. Formerly with E. F. Hauserman Co., he was in charge of its field measurement department.

E. F. Meier joined **Glascote Products Inc.**, Cleveland, subsidiary of A. O. Smith Corp., as technical assistant to the general manager.

Theodore E. Padkins was appointed works manager, **Scullin Steel Co.**, St. Louis.

Reliance Division, **Eaton Mfg. Co.**, appointed **E. C. Gross Jr.** district manager at Chicago; **William R. Chandler**, assistant district manager at Detroit.

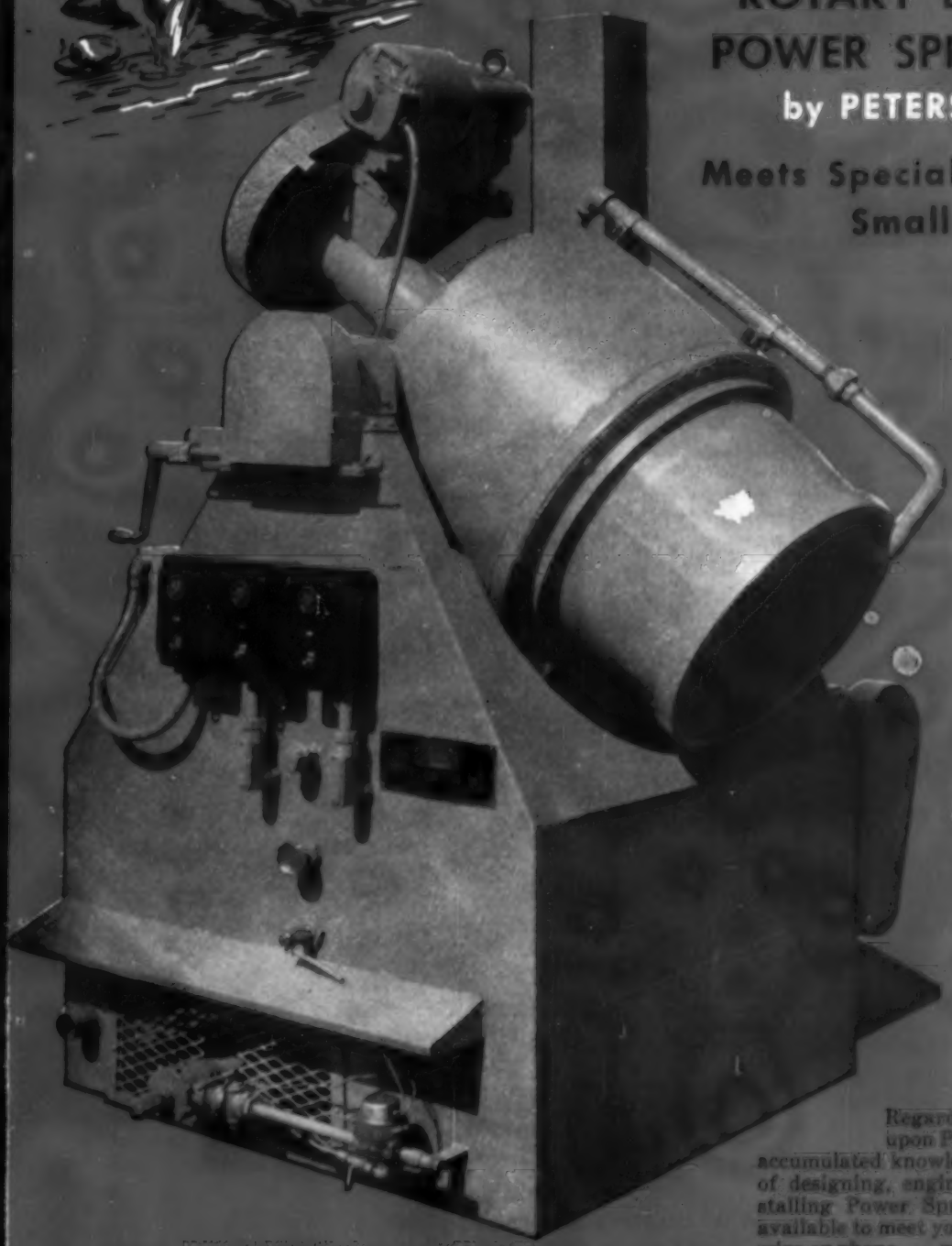
Raymond Corson was made super-

SMALL PARTS—*thoroughly washed, rinsed and dried*

ROTARY DRUM-TYPE POWER SPRAY WASHER

by PETERS-DALTON

Meets Specialized Needs for Small Parts Assembly



Many equipment manufacturers utilize numerous small complex parts in the assembly of their products. To thoroughly clean them from dirt and chips after machining operations, requires equipment engineered and built for the job. The Peters-Dalton Small Parts Washer, illustrated here, has a capacity of one to four cubic feet of work load per hour, depending upon part size and production requirement. It performs a 4-cycle operation of: soak; wash at 160°-170°; rinse, utilizing plant hot water; and blow-off, using hot combustion gases from the water heater. It has a pump capacity of 20 g.p.m. at a 30' head; tank capacity, 75 g.p.m.; and the heat supply is by gas, indirect fired. After fabrication, Peters-Dalton delivered this washer ready for plant services by the customer.

Regardless of your needs, depend upon Peters-Dalton experience. The accumulated knowledge of more than 25 years of designing, engineering, fabricating and installing Power Spray Washing Equipment is available to meet your specifications. Just write, wire or phone . . . we'll be glad to tell you more.

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- Industrial Washing Equipment
- Drying and Baking Ovens
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HARRY L. QUINN
heads Donegal Steel Foundry

E. L. OEHLING
Hydraulic Press gen. sales mgr.

visor of industrial engineering at **R. E. Dietz Co.**, Syracuse, N. Y.

Harry L. Quinn was elected president, **Donegal Steel Foundry Co.**, Marietta, Pa., in which he has purchased a controlling interest. He was treasurer and general manager of Lebanon Steel Foundry.

James R. Ireland was made director of research and engineering, **Indiana Steel Products Co.**, Valparaiso, Ind. He was director of research.

F. John Pichard was promoted to manager, standard equipment sales, at **Wheelabrator Corp.**, Mishawaka, Ind. He was district sales engineer in the New York office.

R. C. Perrault was made New York district sales manager, **Detroit Steel Corp.**, to succeed the late **Mark E. Morgenstern**. He is replaced as Worcester, Mass., district sales manager by **N. H. Perreault**.

Hydraulic Press Mfg. Co., Mt. Gilead, O., appointed **E. L. Oehling** general sales manager; **R. J. Lindsey**, vice president - engineering. Mr. Oehling, former manager of the central district sales office, succeeds **W. H. Bennett**, recently elected president. Mr. Lindsey was director of engineering. **W. W. Stewart** was appointed chief financial officer to replace **W. N. Woodward**, resigned.

Roy S. Fisher was elected vice president and director of sales for **National Vulcanized Fibre Co.**, Wilmington, Del.

Bulldog Electric Products Co., Detroit, promoted **Larry J. Miller** from buyer to purchasing agent-Detroit plants; **Alex Frost** from buyer to central purchasing agent.

W. Earle Black was made resident engineer, Pittsburgh Works, **Jones & Laughlin Steel Corp.** He succeeds **D. H. Miller**, now planning and development engineer, Pittsburgh office.

Raymond B. Kropp was elected president and chief executive officer of **Kropp Forge Co.**, Chicago. He succeeds **Roy A. Kropp**, now chairman.

William T. Durkin was made Pittsburgh district manager, **Clark Bros. Co.** He was manager of the reciprocating engineering sales department in Olean, N. Y.

Dr. Robert J. Rohr joined **Magnus Chemical Co. Inc.**, Garwood, N. J., as midwest regional sales manager.

Jay P. McDermott was named chief engineer and production supervisor, **Wheeler Engineering Corp.**, Pasadena, Calif.

Stephen H. Badgett, former vice president, Schaible Co., was named vice president-operations at **Aeronca Mfg. Corp.**, Middletown, O.

Solar Steel Corp. appointed **Donald J. Hartman** assistant plant manager; **Elmer Froehlich Jr.**, assistant sales manager at its River Rouge, Mich., plant.

J. Douglas Patrick was made product development engineer, **MacDermid Inc.**, Waterbury, Conn.

Herbert L. Willke, chief engineer, **National Supply Co.**, Toledo, O., plant, transferred to the general offices at Pittsburgh as assistant director of engineering.

Thomas J. Jones was made chief engineer, building materials division, **Wheeling Corrugating Co.**, Wheeling, W. Va.

OBITUARIES...

Newman M. Marsilius Sr., 66, chairman, **Producto Machine Co.**, Bridgeport, Conn., died Oct. 17.

John J. Orlich, 67, founder and president, **Orchem Pumps Inc.**, Philadelphia, died Nov. 6.

W. L. Burgoyne, 58, a consulting airplane engineer, died Nov. 7 at his home in Lake Success (L. I.), N. Y. He also was president of **Aviation Maintenance Co.**, Arlington, Va.

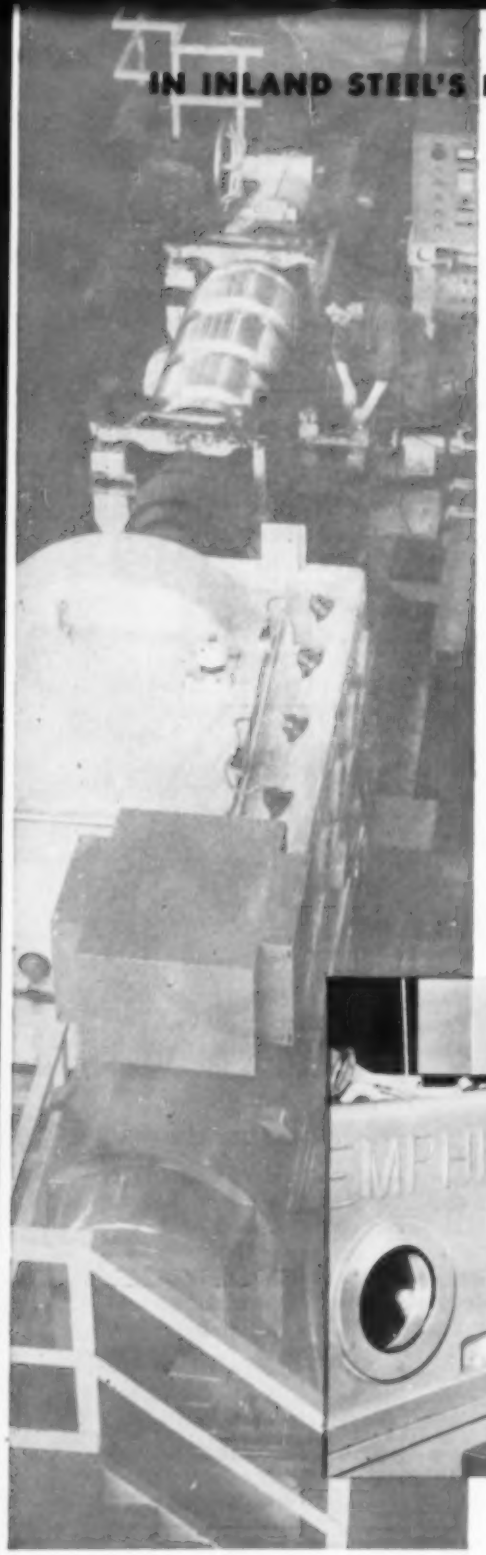
Kenneth C. Brown, 50, owner and operator of **Electro Processing Co.**, Dayton, O., died Nov. 7.

Robert W. Lea, 70, retired president, **Johns-Manville Corp.**, died Nov. 13 in New York.

Allison W. Laytham, 51, president, **Laytham Foundry**, Paterson, N. J., died Nov. 12.

James Kniveton, 58, engineer and a vice president of **Selas Corp. of America**, Philadelphia, died Nov. 12.

William De Grasse Jr., 44, assistant plant manager, **Commercial Shearing & Stamping Co.**, at Chicago, died Nov. 11.



IN INLAND STEEL'S ROLL DEPARTMENT

New Mack-Hemp electronic contouring lathe removes metal at peak rates with .001″ accuracy

An electronic "pilot" guides this 48″ Mackintosh-Hemphill contouring lathe recently installed in the Roll Department at Inland Steel Company's Indiana Harbor Works. It is so precise that the lathe can finish contours into a roll without deviating more than .001″ from the pattern on the full-size template.

Stylus contact with the template controls the lathe's longitudinal- and cross-feed motors through electronic linkages. Thus, dual feed motion response of the tool holder carriage is instantaneous and smoothly continuous. Any conventional groove shape can be duplicated—it is even possible to make an accurate cut on a shoulder vertical to the axis of the roll.

But this precision of control is only one reason why the big lathe can turn shape rolls so rapidly. It has been designed and built to handle some of the heaviest torsional loads ever imposed on a lathe. For example:

It can operate continuously through a ⅞″ cut depth with feeds between .060″ and .100″, and with spindle speeds up to 62 RPM. It can turn rolls or forgings 50″ in diameter and 18 feet long.

If you are planning to install new large-roll turning capacity, you'll be wise to investigate these cost-cutting automatic contouring lathes. Write us today for complete information. They're available in 48″, 60″ and 72″ sizes.

Inland's new 48″ Mack-Hemp automatic lathe here is cutting passes into a new roll for a 3-high structural mill that rolls 15″ I-beams. Hardness of the roll is 42 Shore.

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cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings
heavy duty lathes • steel and special alloy castings

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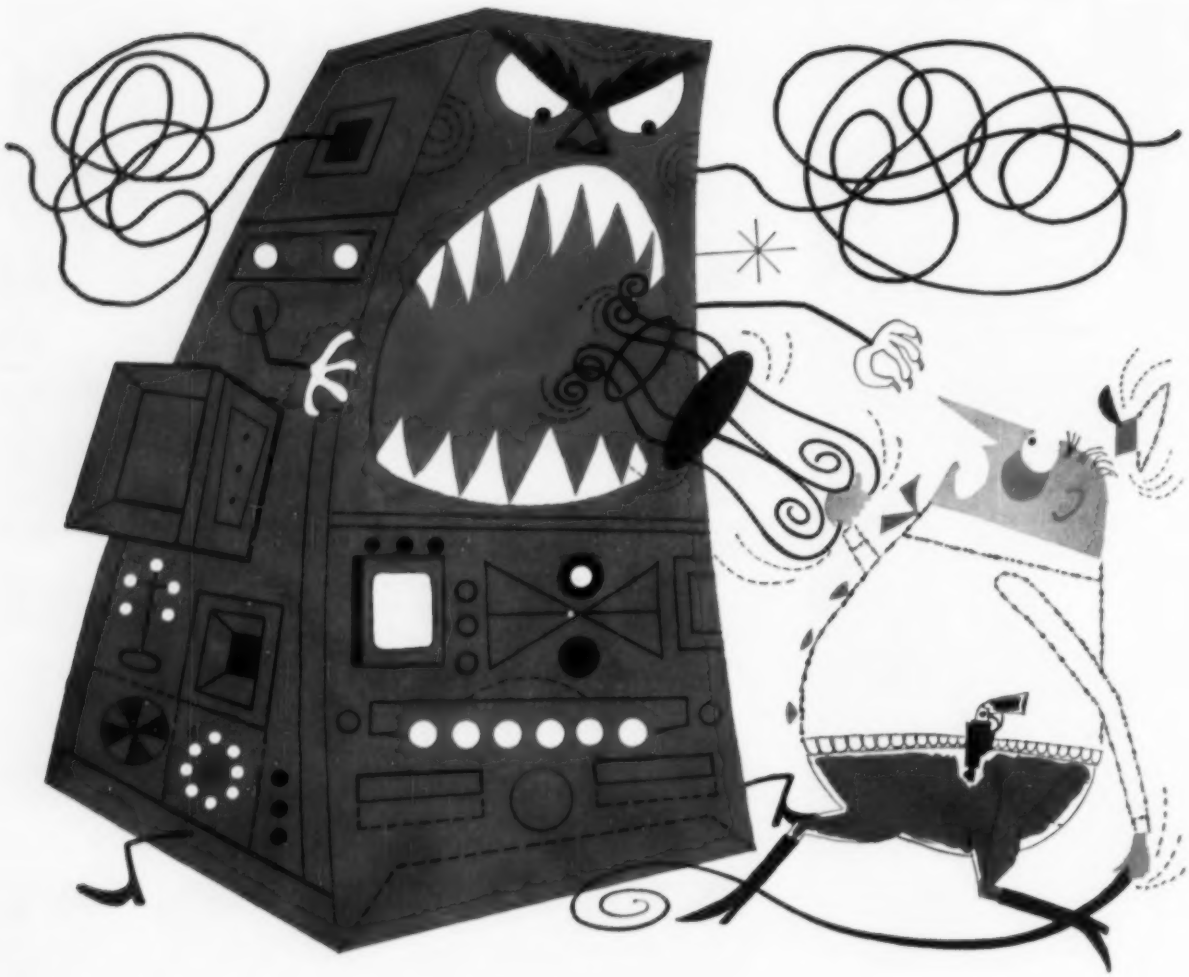

Taming a wire fabricating machine?

Call American Steel & Wire!

Wire machines can be ornery. They seem to have a brain that delights in fouling up a high speed production line.

Very frequently, your American Steel & Wire representative can tame things down. With over a century of company experience behind him, he may be able to suggest a minor change in wire specifications, die construction or fabricating procedure that will solve the problem.

At AS&W, we *use* a lot of wire in our own plants, and have learned a lot of little tricks that are yours for the asking. Just call your American Steel & Wire representative.

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UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, O.
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN MANUFACTURERS WIRE

USS

AMERFINE—*high quality fine wire.*
AMERSPRING—*music steel spring wire.*
AMERTEMP—*heavy-duty oil-tempered wire.*
AMERLOY—*alloy heading wire.*
AMERHEAD—*uniform heading wire.*
AMERSTITCH—*extra-tough metal stitching wire.*

UNITED STATES STEEL

Ends Steel Rolling

Presteel sells mill to Rome Strip Steel. Will concentrate on metal stamping operations

INCREASED demand for metal stampings has brought the "end of an era" at Worcester Pressed Steel Co., Worcester, Mass. The company is terminating its steel rolling activities to make way for increased stamping business.

All of the company's rolling equipment has been sold to Rome Strip Steel Co., Rome, N. Y., says Carter C. Higgins, president and general manager of Worcester Pressed Steel. The building that housed the rolling machinery will be equipped with new blanking presses. Other equipment that has been ordered includes a bright anneal furnace.

Worcester Pressed Steel Co. installed its Belgian 3-high mill in 1912. The steel rolling activity was undertaken initially so that it could secure better material than was available at that time for its stamping presses. Until the early 1920s, the company imported hot-rolled strip steel from Sweden, then rerolled it for close tolerances and temper control. Large amounts of locomotive tire shim steel were rolled by the company.

Opens Flame Hardening Plant

Chicago Flame Hardening Co. opened its plant at 420 E. 151st St., East Chicago, Ind. John R. Keeler is general manager of the company. G. D. Scott is plant manager.

More Titanium Needed

Titanium mills are expanding rapidly in preparation for pending airplane jobs. Boeing and North American, in competition for an Air Force bomber project, are preparing Phase 1 prototypes calling for extensive use of the metal.

Boeing's production prototype will be nearly 100 per cent titanium, according to reports. North American is making three prototypes: One calls for large quantities of titanium; another requires mostly stainless steel; the third uses the two metals in about equal quantities.

Boeing and Air Force officials have been informed by the titanium industry that its production will be expanded to assure adequate supplies by next spring. Current output is insufficient to support production of the Boeing model.

Loftus Forms New Division

Loftus Engineering Corp., Pittsburgh, established a Heat Treating Furnace & Oven Division in Chicago. The Pittsburgh division is now devoting itself exclusively to the design and building of steel mill equipment and induction furnaces. The Chicago division provides customer service for the engineering and building of heat treating furnaces and other shop fabricated units.

Dixon Crucible Expands

Joseph Dixon Crucible Co., Jersey City, N. J., completed construction of a high temperature kiln designed for burning refractories. This is the firm's first phase of a facility expansion program for the manufacture of refractory products.

Plans $12-Million Parts Unit

International Harvester Co. of Canada plans a $12-million investment in a parts depot near Hamilton, Ont. The project will be in operation late in 1957.

Israel To Get Carbide Plant

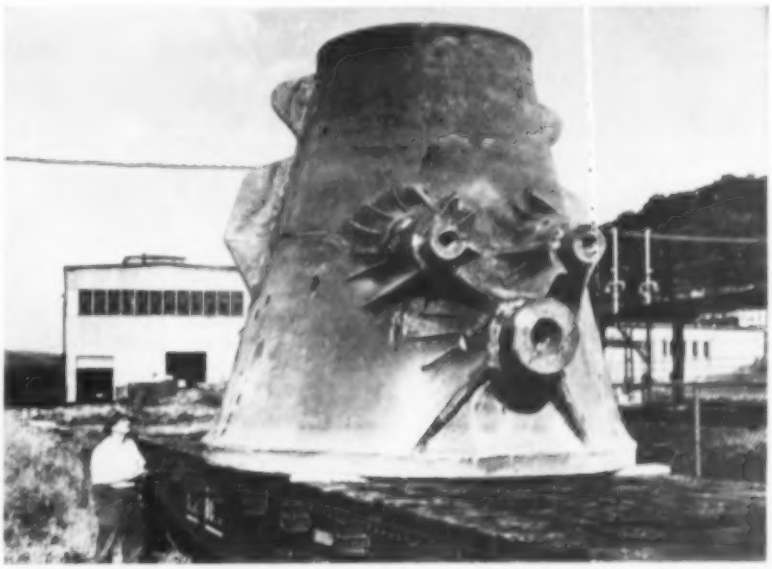
Adamas Carbide Corp., Kenilworth, N. J., has signed a contract with Iscar Ltd., Nahariya, Israel, for the first tungsten carbide manufacturing facility in the Middle East. Adamas will furnish pressing and sintering equipment which will be used in the manufacture of tungsten carbide tips, tools, dies and wear parts.

Ohio Furnace Co. Builds

Ohio Furnace Co. Inc., Columbus, O., is constructing a $200,000, 32,000 sq-ft office and warehouse at Kenney and Kinnear roads, that city.

Swanson Tool Changes Name

Swanson Tool & Machine Products Inc., Erie, Pa., changed its name to Swanson-Erie Corp. The firm builds special machines and is a pioneer in the field of



Blaw-Knox Metallurgist Koglin Checks Unique Slag Pot

Several advancements in the founder's art are revealed in this slag pot made by Blaw-Knox Co., Pittsburgh. Having a capacity of 480 cu ft, weighing 47,000 lb, it is one of the largest ever made. It is one solid casting, including the flat bottom and three trunnions on either side. Unusual also are the integrally cast trunnions which are normally found on the slag pot cradle rather than the pot

standard indexing machine chassis for automatic processing and assembly operations.

Will Fabricate Flat Steel

Sperry Rand Corp.'s Remington Rand Division purchased a plant at Cobleskill, N. Y., from Tyler Refrigeration Corp. The plant will be used to fabricate flat steel for components in its line of electronic equipment.

Steel Warehouse Changes Name

Emergency Steel Service Corp., Skokie, Ill., changed its name to Rolled Steel Corp. The firm was organized at the end of World War II to supply surplus government steel to industry during the acute steel shortage. It now gets all its steel from mills.

Opens Second Canadian Plant

Federated Metals of Canada Ltd. opened the second of its two new Canadian nonferrous metal fabricating, processing and refining plants. The facility, which is in Lachine, a suburb of Montreal, contains some 40,000 sq ft of floor space. The other plant is in Scarborough, near Toronto, Ont. The plants produce such specialized products as solder, grid metals, antimonial leads, type metals, babbitt metals and zinc die-casting alloys. The Montreal plant also fabricates lead sheets, pipes, traps and bends, and operates a lead construction department. The plants also process practically every type of nonferrous scrap.

Columbia To Charter Vessel

Columbia Transportation Co., Cleveland, will charter a large vessel the Great Lakes Engineering Works at River Rouge, Mich., will build for the Northwestern Mutual Life Insurance Co., Milwaukee. Scheduled for delivery in the spring of 1958, the boat will be the largest on the Great Lakes —cargo deadweight capacity will be about 25,000 gross tons. It will be capable of going down through the St. Lawence Seaway as far as Seven Islands. Specs include: Over-all length, 729 ft; beam, 75 ft; depth, 39 ft. The vessel will have coal-fired boilers and a 7500 shaft horsepower steam turbine designed to propel it at about 16 mph.

ASSOCIATIONS

Wire Association, Stamford, Conn., elected these officers: President, Tom M. Girdler Jr., Union Drawn Steel Division, Republic Steel Corp., Massillon, O.; vice president, Ferrous Division, A. B. Dove, Steel Co. of Canada Ltd., Hamilton, Ont.; vice president, Nonferrous Division, J. E. Flood, Plastic Wire & Cable Corp., Jewett City, Conn.; executive secretary, R. E. Brown.

George W. Baillie Sr., Quaker City Foundry Inc., Salem, O., was re-elected president of the **Industrial Information Institute.** It supplies facts about industrial activities to people in the Youngstown-Warren-Alliance-Sharon, O., area. Vice presidents are: H. M. Heckathorn, Youngstown Kitchens Division, American Radiator & Standard Sanitary Corp.; A. M. Tredwell Jr., Sharon Steel Corp.; T. S. Long, Taylor - Winfield Corp.; E. C. Carlson, Carlson Electric Co. Other officers are: Secretary, R. H. Seiple, Trumbull County Manufacturers Association; treasurer, K. M. Lloyd, Mahoning Valley Industrial Council.

NEW ADDRESSES

Universal Screw Co. moved into its new plant at 2401 Brummel Place, Evanston, Ill. The firm makes screws and bolts.

Barton Instrument Corp. moved to a new plant at 580 Monterey Pass Road, Monterey Park, Calif. Production of flowmeters, recorders and gages for industrial use will be expanded.

Maday Body & Equipment Corp. moved its manufacturing facilities to the former Bison casting plant at 575 Howard St., Buffalo. The plant has 67,000 sq ft of floor space, more than double that at the former location.

CONSOLIDATIONS

Philco Corp., Philadelphia, purchased **Sierra Electronic Corp.,** San Carlos, Calif., maker of electronic test equipment, UHF transmitters, television studio equipment and similar devices.

Standard Steel Corp., Los Angeles, acquired **Leader Iron Works,** Decatur, Ill., whose principal products are asphalt paving machines.

Fine Tubes Ltd., Surbiton, England, an affiliate of Superior Tube Co., Norristown, Pa., acquired **Moray-Engineering Co. Ltd.,** Epsom, Surrey, England, builder of special machinery and manufacturer of machined parts and subassemblies for the automotive, aircraft and electronic industries. Fine Tubes Ltd. specializes in the production of seamless nickel cathodes and electronic parts.

Universal Corp., Washington, purchased **Marion Power Shovel Co.** and **Osgood Co.,** Marion, O., producers of excavating equipment and mobile cranes. Milton T. Smith was elected president of the two companies which will be operated as divisions of Universal. Universal was created from assets involved in the sale of Capital Transit Co. of which Louis E. Wolfson, chairman, was the principal owner.

Pettibone Mulliken Corp., Chicago, is acquiring **Mercury Mfg. Co.,** that city. Mercury makes tow tractors, electric lift trucks and trailers. Pettibone Mulliken makes castings, forgings, conveyors and slurry pumps.

Five firms have merged and will be operated by **Franklin Research Corp.** They are: **Frank Industries,** Worcester, Mass. (electronic connectors); **Brown Bag Filling Machine Co. Inc.,** Fitchburg, Mass. (packaging machinery); **Standard Machinery Co.,** Mystic, Conn. (extruding machines); **Wheeler Reflector Co.,** Hanson, Mass. (lighting fixtures); and **Paul Whitin Mfg. Co.,** Gilbertville, Mass. (synthetic yarns).

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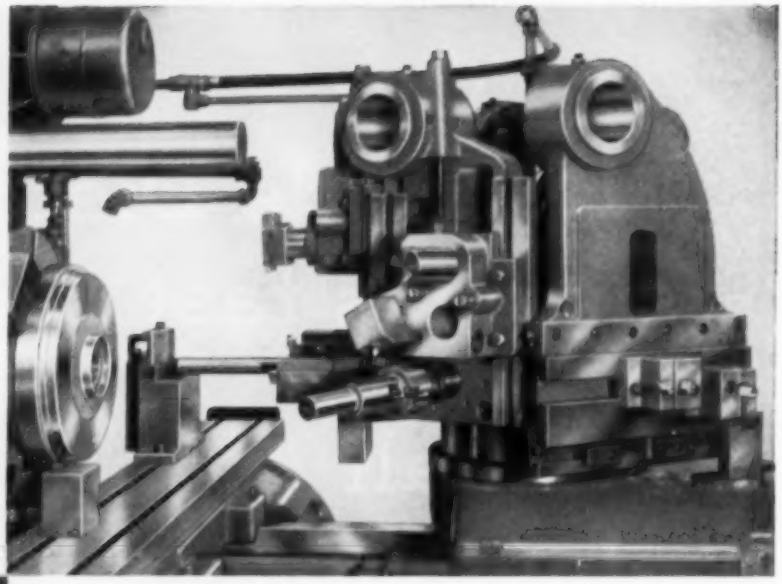
See Reynolds new program, "CIRCUS BOY", Sundays on NBC-TV

"SPADE WORK" *pays off . . .* *on a* POTTER & JOHNSTON 6DRE-40 AUTOMATIC with P&J-ENGINEERED TOOLING

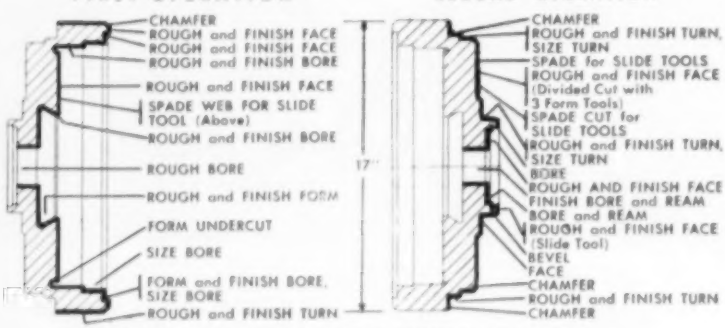


THE PROBLEM –

To machine this hard (288 Brinell) cast iron flywheel . . . requiring *48* close-tolerance cuts . . . quickly and economically.

THE SOLUTION –

Doing the job on a P&J 6DRE-40 Automatic Chucking Turret Lathe . . . with the extra power and rigidity it takes to use fast-cutting carbide tools with real efficiency. And doing the job with P&J-Engineered Tooling (see diagrams) . . . ingenious use of spade cuts followed by divided cuts with 2 or 3 slide tools operating simultaneously finished broad surfaces *fast!* First chucking (22 cuts) was finished in just 14.41 minutes . . . the second (26 cuts) in just 9.69 minutes!



HEAVY LINES INDICATE MACHINED SURFACES

Yes, in *this specific* job, "Spade Work" refers to the spade cuts used in the cost-cutting tooling set-up. But in addition, every time you put a hard-to-machine job on a P&J Automatic, you get the benefits of another, more important type of "spade work." This is the basic research and development engineering that has gone into every P&J Machine . . . gives it the ability to handle tough metals and complicated cuts with cost-saving speed and ease. And it's the engineering skill and experience that goes into P&J Tooling to insure the best possible combinations and sequences for minimum machining time. If you're interested in piling your profits higher, it's time to dig into the facts about a Potter & Johnston 6DRE-40. Write for Bulletin No. 159 or phone the Pratt & Whitney Office near you, and ask a Direct-Factory Representative to call and discuss your requirements. Potter & Johnston Company, Pawtucket, Rhode Island (Subsidiary of Pratt & Whitney Company, Inc.).

POTTER & JOHNSTON

Precision Production Tooling for More Than Fifty Years

AUTOMATIC CHUCKING TURRET LATHES

STEEL

November 26, 1956

Technical Outlook

VACUUM HEAT TREATING— A vacuum annealing furnace that can handle several tons of titanium sheets at a time is going into operation at Mallory-Sharon Titanium Corp., Niles, O. It uses horizontal charging, which is made possible by eliminating insulating materials. No refractory brick linings are used; heating elements are placed within the retort, and radiation shields serve as thermal insulation. Here are some of its specs: Charge space, 12 x 4 x 4 ft; operating temperature, 1600°F; vacuum, one millionth of an atmosphere. Westinghouse built the unit.

CO_2 CORE INDICATOR— A core binder for the CO_2 process is supplied with a color indicator. The core is purple until it's properly cured, then it takes on its normal sand color. Archer-Daniels-Midland Co., Cleveland, its developer, says the system is a valuable guide in rigging vents and designing cores for the most efficient flow of CO_2 gas.

BIGGEST WELDER?— One of this country's biggest commercial jetliners will have its tail stitched by an outsized spotwelder. Said by the maker, Federal Machine & Welder Co., Warren, O., to be the largest, it's over 13 ft tall, weighs 58,000 lb and delivers 100,000 amperes. Throat clearance betters 2100 sq in. to accommodate big sections.

CLOSE MEASUREMENT— A photometric instrument, called the Quantum Ellipsometer, measures extremely thin film thicknesses (molecular dimensions) within the accuracy of a few angstroms. It is expected to aid in the study of lubricating agents, surface coatings and adhesives. Quantum Inc., Cheshire, Conn., makes it.

COATING FOR SATELLITE— The magnesium satellite for Project Vanguard (STEEL, Oct. 15, p. 120) will be given three coatings: Chromium, then aluminum (for high visible reflectance), then silicon monoxide (to protect against oxidation). Magnesium samples so coated have shown the desired properties, says Dr. George Hass who is in charge of this work at the Corps of Engineers, research and development laboratories, Ft. Belvoir, Va.

SANDWICH BOOM— Although load bearing capacities of structural sandwich panels have been proved conclusively, only aircraft makers have taken full advantage of them in their bread-and-butter business. Edward Kuenzi, chairman of the structural sandwich panel committee, American Society for Testing Materials, looks for widespread use of them in the building industry.

NEW ZINC STANDARDS— Six new standard spectrographic samples of zinc-base alloys are available from the National Bureau of Standards. They're used to check analytical methods for two die-casting alloys—ASTM AG40A and AC41A. Three standards are issued to cover the range for each alloy.

RHENIUM— A two-year research program on the use of rhenium in electron tubes has been started by Battelle Memorial Institute, Columbus, O. Although a relatively scarce and expensive metal, its properties are potentially important for electronic use: 1. It's highly resistant to the water cycle. 2. It remains ductile after high temperature cycling. 3. It doesn't form a carbide at elevated temperatures.

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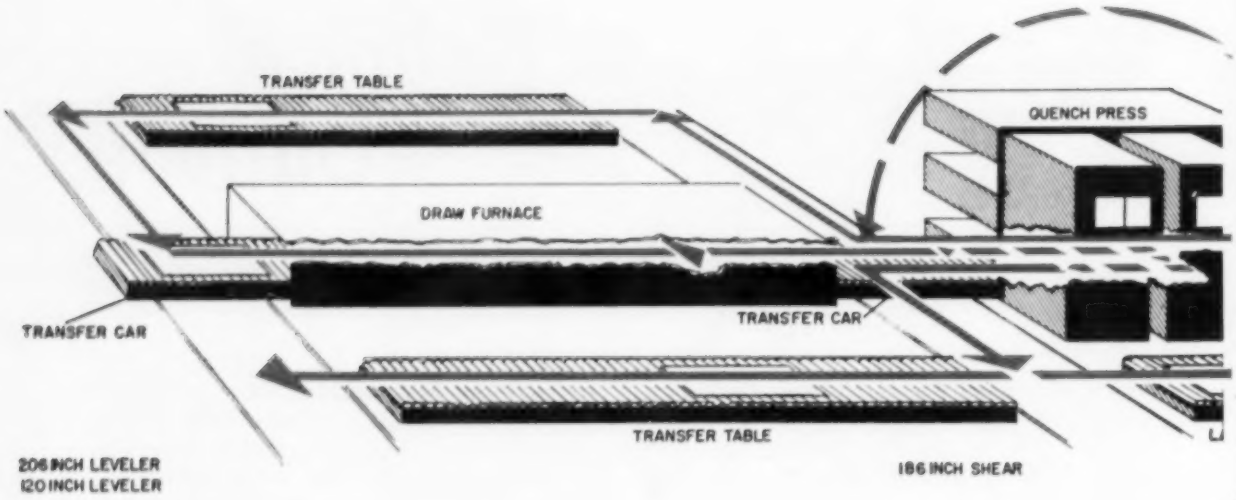
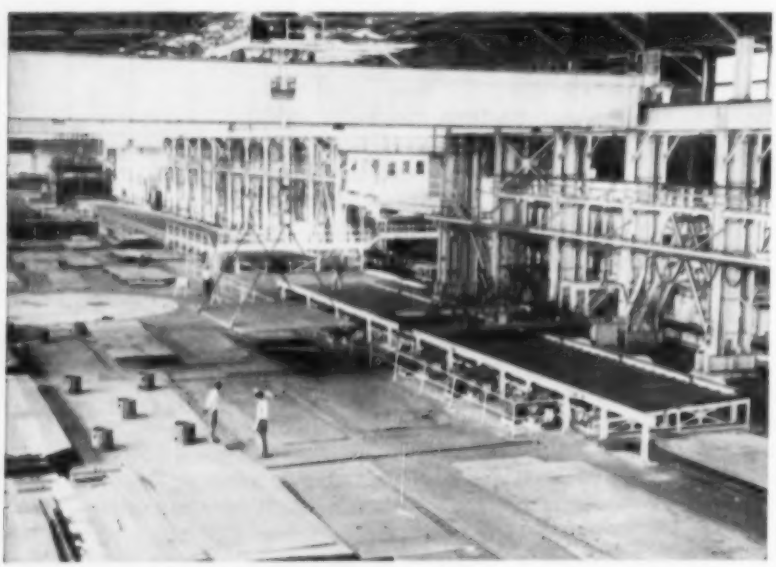


Plate Traffic Moves Fast

CHUNKS of steel plate that weigh as much as 40 tons roll through the heat treating line shown above with no more effort than it takes to push a button or adjust a knob.

One operator, surrounded by 75-odd switches and pushbuttons, some 50 red and green lights and two television receivers, moves the heavy plate through the 600-ft-long production line. From his booth mounted above and to the side of the furnace quench press—some 18 ft above the floor — he controls equipment that produces heat treated plate fast and cheap. Quality control is efficient.

Alloy Plate — This multimillion dollar installation is in operation at Lukens Steel Co., Coatesville, Pa. It is designed for the heat treatment of alloy steel plate, such as nickel-chromium, manganese-moly and other alloy combinations whose metallurgical properties are greatly improved by quenching and drawing. The facility is also used to normalize carbon plate and for heat treatment of alloys such as Lukens T-1 steel.



One operator regulates flow of plate from control station mounted alongside quench press (center of photo). Continuous furnaces are in back. Layout and test block cutting tables are in front

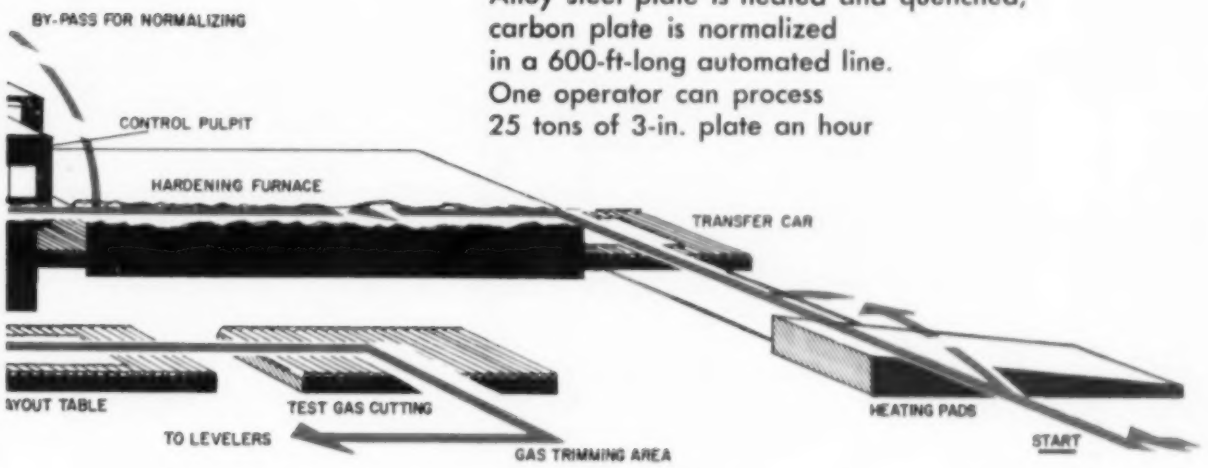
Layout—Starting at right end of the line, the illustration shows the 145-ft-long hardening furnace, the pressure quench, the quench transfer car, transfer tables and the tempering (draw) furnace.

It's an all roller-hearth line. Driven rolls automatically handle the work. All drives are reversible and are operated from the central control pulpit.

Sizes—The line will take plates 172 in. wide, 3/16 to 3 in. thick. Maximum plate length, set by the length of the quench unit, is 43 ft. Somewhat longer plates can be normalized.

Typical production cycles for alloy plate are: For 3 in., 7½-hour hardening cycle to reach and hold at 1650°F, followed by a quench; 7½-hour tempering cycle to reach and hold at 1250°F, and another quench. For 2 in., opera-

Alloy steel plate is heated and quenched, carbon plate is normalized in a 600-ft-long automated line. One operator can process 25 tons of 3-in. plate an hour



Lines show how plate flows through new Lukens heat treating facility

in This Line

tions require 5 hours each; for 1 in., 2½ hours each.

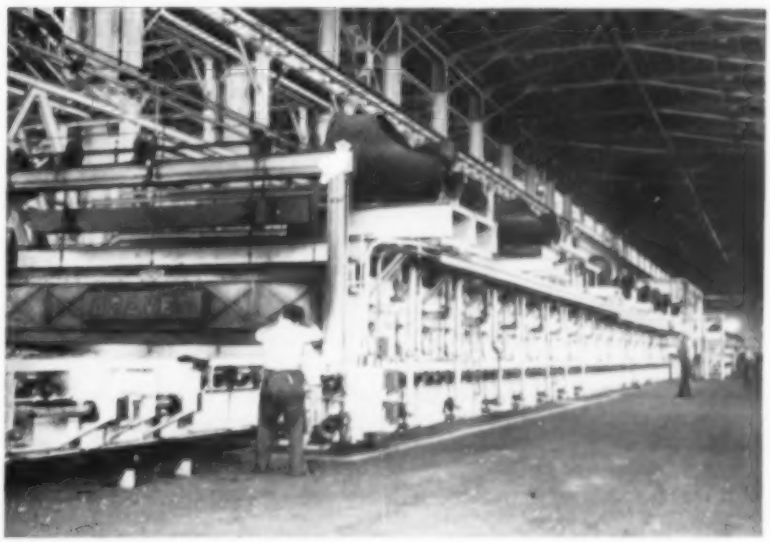
About 25 tons of the 3 in. can be hardened and tempered per hour if maximum width and length are loaded.

Start—Plate enters the hardening furnace from the transfer charge car—it's nothing more than a roller table. Each roll is driven by a roller chain sprocket and continuous chain and is adjustable up to speeds of 100 lineal feet per minute. The car can be driven to the charging furnace at 50 feet per minute.

All transfer cars are similar in design. Photoelectric cells are used to limit plate travel on the rolls and to position the cars in line with other equipment. They also prevent plate movement beyond the end of the car unless it is in position to discharge or receive plate.

Switches for handling the cars are installed at floor level, so control can be taken away from the operator in emergencies.

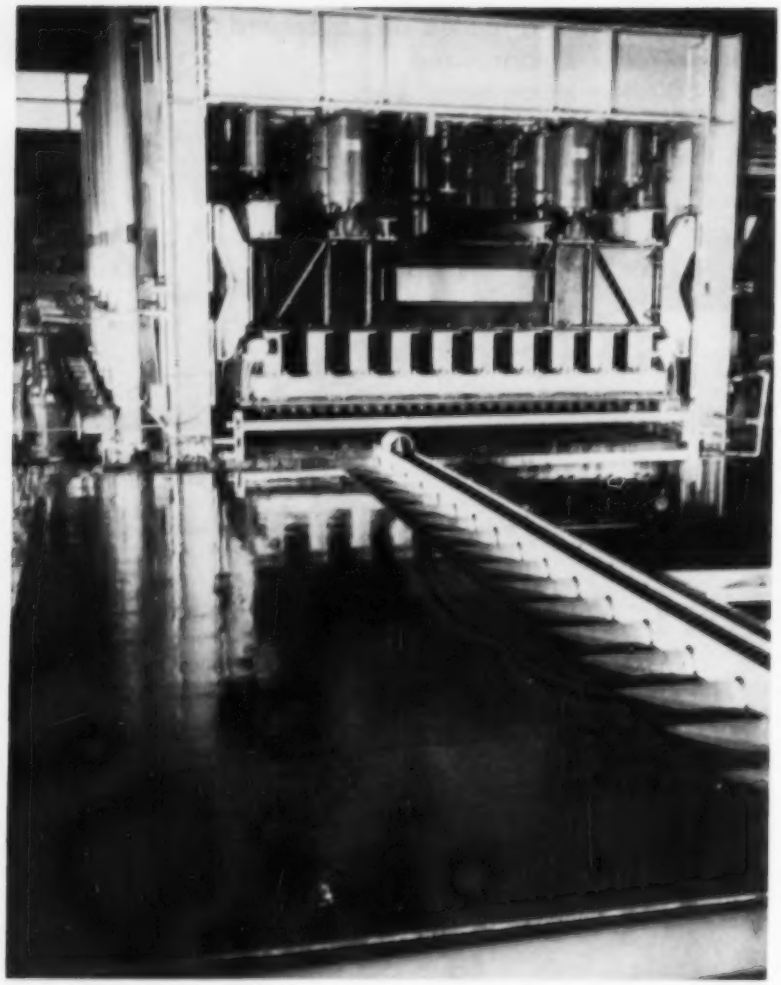
Furnace—The hardening furnace is fed continuously at the adjusted furnace speed from the transfer charge car. Swing gears engage the car roll drive to the furnace drive. The roll speed in the furnace can be varied from 0.6 to 4.8 feet per minute.



The 1650°F hardening furnace has wall-to-wall dimensions of 190 in., is 145 ft long. It is fed continuously at furnace speed from the charge car through swing gears engaging the car roll drive to the furnace drive

The furnace rolls, 14 in. in diameter, are made of chrome-nickel alloy. They are among the largest and longest centrifugally cast rolls ever used in a furnace. Over-temperature protection thermocouples are used under one roll in each heat zone. An electric alarm system on each section of roll drive warns the operator if roll rotation fails.

Seven Zones — The hardening furnace is designed for a maximum of 1650°F and a minimum of 750°F. It's divided into seven 20-ft zones. The first three are heating zones which are overfired and



The quench press maintains plate flatness during quenching. It is hydraulically operated with oil, exerting pressure up to 2500 tons on a 172 in. x 10 ft plate during water spray quenching

underfired. The last four are holding zones and are overfired only.

The burners are oil or gas type. Top heat input to the furnace is 56,000,000 Btu per hour — about 35,000 Btu per hour per square foot of hearth area in the heat-up section, and about 15,000 in the holding section.

Quench — Plate goes into the pressure quench at the furnace runout speed on tubular steel rolls —all are driven by a continuous chain drive connected through clutches to the furnace runout drive.

The purpose of the press is to keep the plate flat during quenching. It can employ a maximum pressure of 4.5 tons per square foot of plate. Effective width of the pressure quench is 180 in., length is 45 ft, clear height, 18 in.

Plate can also be discharged through the quench press to the transfer table where it is air-cooled for normalizing.

High pressure can be applied to one, two or three sections of the press, depending on plate length. This prevents damage to the quench structure not containing plate. Quench water is supplied by three, 8000-gpm pumps at 140 ft head.

Only the amount of water and hydraulic pressure used are controlled manually. All other control for quenching are automatically handled through three switches.

Rolls on the 206-ft long transfer table are also driven. One end section is isolated from the main drive by clutches. If a plate must wait for a transfer car to take it to the tempering furnace, the remaining 150 ft of table can still be used.

Versatility — The 200-ft long tempering furnace is also a high temperature unit. This was done to provide additional normalizing facilities.

Although the normal work flow is toward the quench, heating and drive are reversible. This relieves congestion in the quench car area when both furnaces are being used for normalizing.

Plate traffic is regulated in the control booth—the nerve center of the installation.

Help—Six RCA industrial television cameras permit the operator to see all areas of the furnace line not visible from his overhead control room. Television "eyes" are at various blind spots in the U-shaped line.

Each camera has a control unit and three of them are switched into one line amplifier, then into one of the two receivers in the booth. Switching is also arranged so a picture can be viewed on either receiver in emergencies.

Other Facilities—In addition to the heat treating facilities, the line includes a 186-in. shear that will handle heat treated alloy plates up to ¼-in. thick, and two cold roller levelers for flattening plates after heat treatment. The 130-in. wide leveler will flatten plates 3/16 to ½-in. thick while the 200-in. wide leveler will cold level alloy plates ½ to 2 in. thick.

The layout table positions the heat treated plate under a Travograph mechanism that scribes the plate for shearing or gas cutting to size. Test blocks are also laid out at this time. The plate is then moved to the cutting table, where it is again positioned under a Travograph. Test blocks are cut and sent to the laboratory for analysis.

The furnace line, exclusive of other facilities, was built by Drever Co., Bethayres, Pa.

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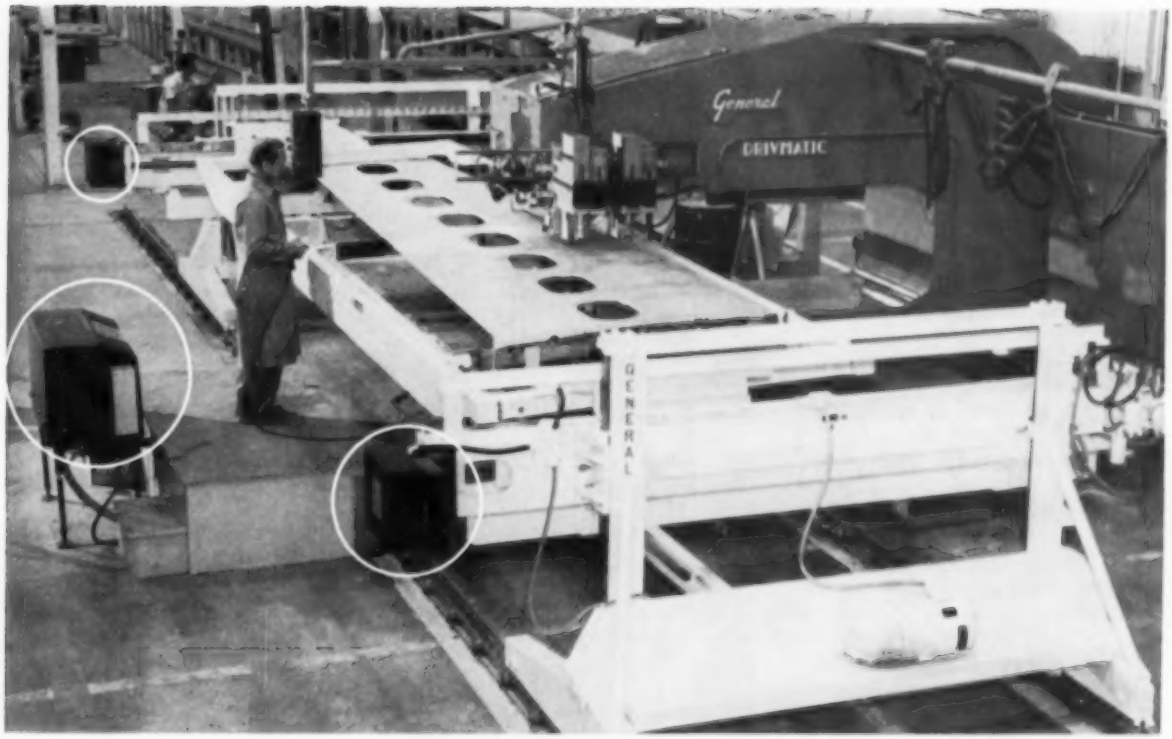


This unit automatically drills, countersinks and rivets the wing segment shown. The operator is only a safety feature; all operations are controlled by tapes in the black boxes

Tape Control Speeds Riveting

THE outsized machine in the photograph above rivets 20-ft wing segments automatically at Northrop Aircraft Inc., Hawthorne, Calif.

It's an example of how tape control increases production: Douglas Hugill, supervisor of manufacturing research and development, says that wing output is 400 per cent higher than it was with hand methods.

Tight—The machine requires only one operator to start it, or shut it off in an emergency. General Riveters Inc., Buffalo, built it.

The machine is set up with a transit or sight level, which locates each rivet with pinpoint accuracy. Three tapes are punched with data which correspond to the position and cycle requirements of indicators placed at the end of each tape.

Light—Tapes are opaque, 35-mm film. A small light passing through the holes activates photoelectric cells.

Tapes at either end of the machine's carriage control transverse travel. A larger tape controls longitudinal travel of the carriage and actuates the riveting sequences. As many as seven rows of holes, each for a different operation, may be punched across the tape.

An electronic eye controls the location of the drilling head over the rivet location. It is flanked by sensing eyes which anticipate the inertia of the 3-ton carriage, positioning the holes for accurate drilling.

Operation—Other punched holes actuate these operations: A head drills, reams, countersinks and counterbores in one pass with a single tool; slug rivets are fed into an injector, which places the rivet in fingers for transfer to the hole under the rivets set; the set bottoms the rivet on a bucker which moves to the proper depth beneath the hole.

As the table travels, other punched holes lower the bucker to clear projection like ribs or stiffeners and return it to its proper location.

Rivets are driven from the bottom at 16,000 lb of pressure. The rivet is then shaved flush with the skin. No feather edge is left due to the slight counterbore (0.010 in.) in the countersink.

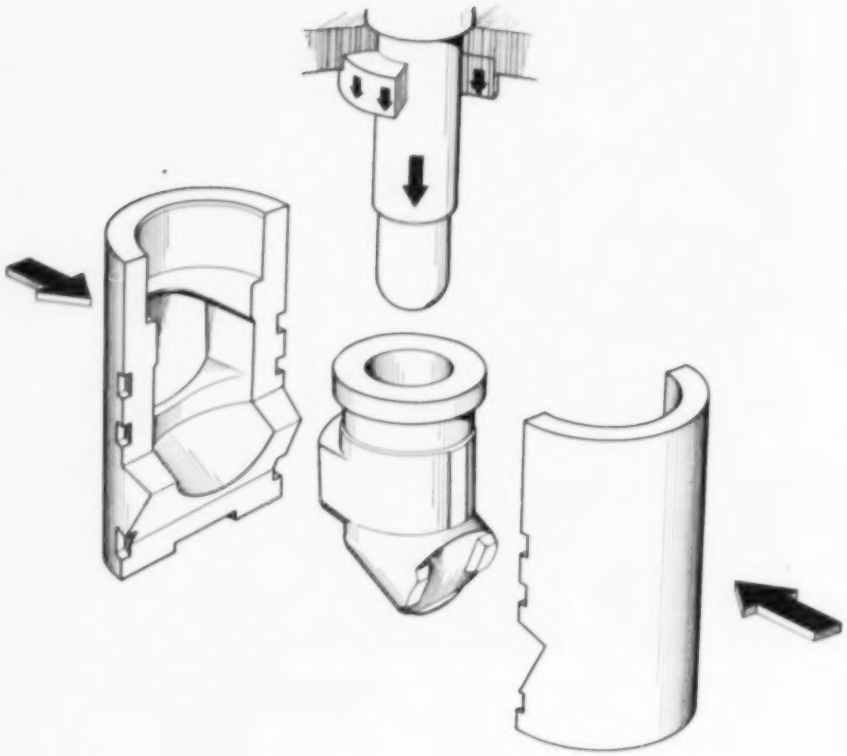
The curved part is kept horizontal at the drilling and riveting heads by twin cams which elevate and tilt the part as the carriage travels.

Travel—Three types of drive are used: Hydraulic for longitudinal travel, reversible piston air motors for transverse travel and electrically driven screws for up-and-down motion.

The machine bed travels on a narrow-gage railway track which is 60 ft long.

Huge multiram press combines horizontal-acting split dies with a vertical ram to form a complex steel valve body. The part stands 42 in. high, weighs about 2370 lb

By DRURY D. TURNER
Sales Manager, Special Products Dept.
Cameron Iron Works Inc.
Houston



Exploded view shows split die cavities and piercing punch in retracted position. Photos at right show sequence (top to bottom) of the forging operation. First, slight pressure from the ram holds the forging in place as horizontal dies close. With dies closed, ram lowers

Split Die Forging Solves a Problem

HERE WAS the problem:

Produce a 1-ton, raw shaped component, 16 in. round, 42 in. long.

Allow for extensive coring to intricate contours, with ports at unusual angles to the axis of the ring.

Make the part of 4130 steel, 80,000 psi tensile, 40,000 psi yield, 18 per cent elongation, 40 per cent reduction in area and normalized in still air, no quench.

We did the job at Cameron with our war-born split die forging technique. The part was made at a cost which was lower than that of competitive methods.

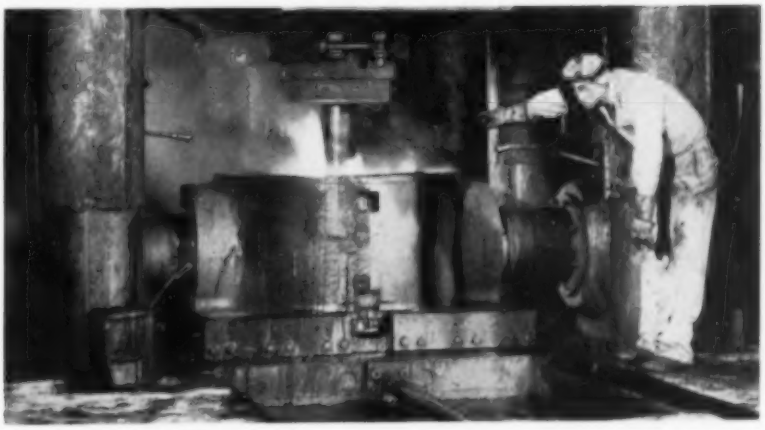
The Part — Typical of split die forgings, this part is the main body of a steam launching valve. It's used by the Navy to operate aircraft launching catapults. Operating temperatures and pressures demand extreme valve properties.

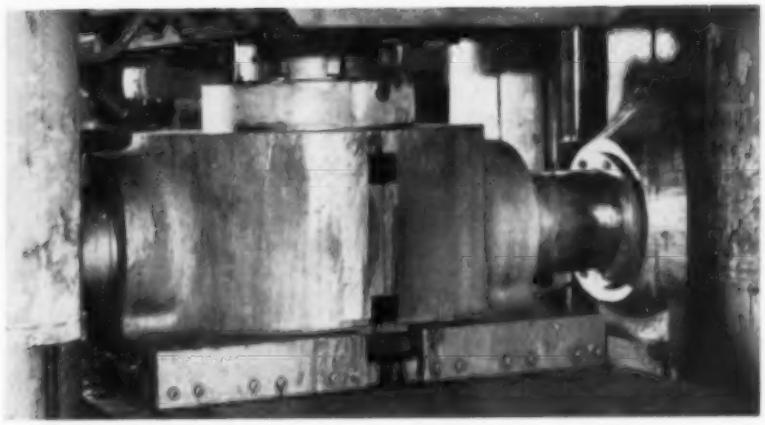
Cameron engineers designed the forging. In addition to the normal consideration of structural specifications, the Navy wanted the forging to duplicate previously used casting dimensions—the location and space allocated to the valve couldn't be changed.

Cameron engineers designed dies for our 11,000-ton multiram press. Each of the three components (besides the main body, there were two flanged ports) had contours with reverse draft, which made them unsuitable for production in pot type dies. They were also unsuitable for production in the largest available impact hammers.

Hand Finished—Die blocks were roughed out to shape, and impressions were made on several of the die sinkers in the shop. They were finished with hand tools to exact drawing dimensions, check assembled and sent to the forge shop for test runs and production.

Production—After a test run, the three components were placed on production schedule. Billet





stock of the modified 4130 steel, which had passed quality tests, was cold sawed into billets. The slug for the main valve body was 16 in. round, 42 in. long and weighed about 2377 lb.

Slugs were put in a rotary hearth heating furnace where they were heated 4 to 5 hours to 2275° F. Then we took out a slug with a mechanical manipulator and exposed it to a high speed revolving chain descaler. With the scale removed from both ends, the slug was set on the anvil of a 1000-ton open die press which upset it enough to spring the heating scale loose from its sides.

The Squeeze—The scale-free slug then went between vertical split dies in the bed of the 11,000-ton press. The vertical dies were closed by the two side rams which have a capacity of 6000 tons, before the down-acting ram (its capacity is 11,000 tons) was closed on the slug. This down-acting ram carries a piercing punch that moved into the slug to a depth of about 30 in.

In piercing the hot slug, the punch pushed the core metal ahead of it toward the bottom of the die and upward around the punch. The ram closed the top die opening. Final movement of metal within the die area took place in a closed system. The metal was upset in the area between the punch and the contour of the die.

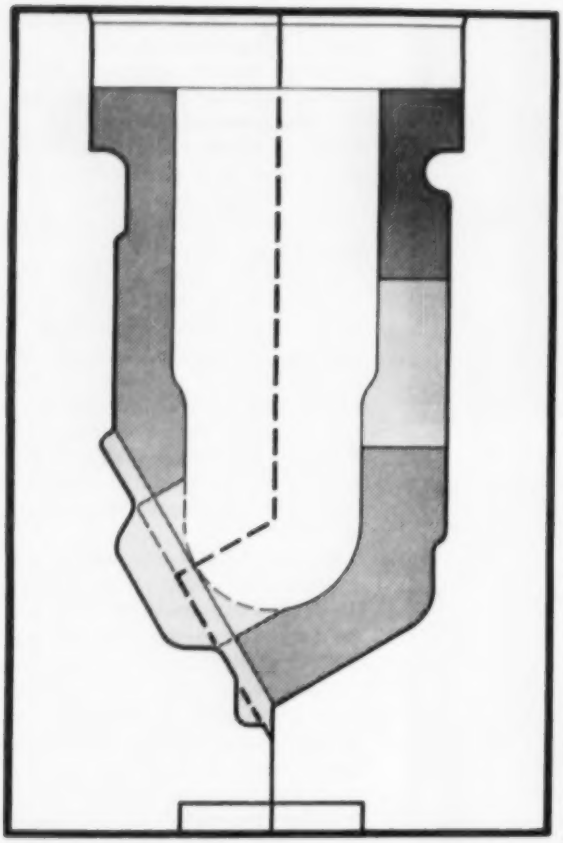
This completed the forging operation. The metal (near 1800°F) filled the contours of the die, and the forged bore was the size and contour of the punch.

Scaling — The main ram of the press was raised, carrying the top die and piercing punch. Side rams were retracted, opening the vertical split dies, leaving the forging free for removal. It was placed on a brick pallet for air cooling, after forging scale was removed. The slight flash at the die parting lines was removed, as well as other minor irregularities on the surface. The forging weighed about 2370 lb, including the slugs left on the bottom for test material.

After cooling and cleaning, the forging was machine bored to complete the rough contour of the inside diameter. We did this before heat treatment to allow free circulation of air inside and outside the forging during heat treatment. Heat treatment consisted essentially of normalizing at 1750°F, and tempering at 1250°F in a continuous, pusher type furnace, after which the forging was placed in a brooder for cooling with forced, high velocity air.

Check—At this stage, a test slug was sawed off and sent to the metallurgical department. If tests proved satisfactory, the piece was passed to stock. If properties didn't conform to specs, the forging was heat treated again and a second slug was tested.

After metallurgical proofing, the forging was rough machined in fixtures on a large boring mill and



Ghost view of closed dies (left) shows irregular die parting line (dotted) and how the metal is displaced by the punch. Light areas indicate metal that's to be removed from the finished forging. Darker areas will stay. Photo at right shows finished forging. It's 42 in. high

faced off on each end by milling. From there, it went to inspection to be checked for dimensional requirements. The approved piece was subjected to a 100 per cent magnetic particle inspection for superficial cracks.

Records — During the entire manufacturing procedure, all items were serialized and identified to show melt of steel and heat treat load. Records of the serial numbers and heat numbers, together with the chemical, physical and mechanical analyses of the pieces, are kept in the Cameron metallurgical department for seven years from the shipping date.

On this job, the forgings were shipped to the Navy at a saving of about 25 per cent.

Press — Over six stories high, the Cameron multiram press was built by Baldwin-Lima-Hamilton Corp., Baldwin, Pa. Dies are mounted on 10 x 10 ft bolsters in the vertical opening, which is 12 ft maximum, 7 ft minimum. The horizontal opening between the side ram faces is 15½-ft.

An added feature is a piercing ram with 3000 tons of capacity which is superimposed on the moving top platen. A 750-ton capacity knockout ram is mounted in the bed. With this machine Cameron can produce 5000 lb cored forgings of intricate design.

Start—During World War II, we faced the problem of making forged parts that were too large, either in size or weight, to be made in the big impact hammers, or had contours too intricate (inside or outside) to be forged in pot type dies. The usual procedure was to make these parts in open dies or to cast them.

New processes and developments have created a demand for the production of metal components with greater service capacities. The chemical processing industry uses valves which operate at temperatures up to 1600°F. A pressure of 10,000 psi is normal for equipment used to control and to complete oil and gas wells—even a request for equipment with a working pressure of 20,000 psi causes few raised eyebrows.

Pilot—To meet the challenge, the first multiram split die press was designed by Cameron engineers. A. B. Farquhar Co., York, Pa., built a press with a capacity of 5000 tons on the down-acting ram and 2000 tons on each of the side rams.

Our accomplishments with this pilot press were even better than we'd expected, and in 1953, our new press was built.

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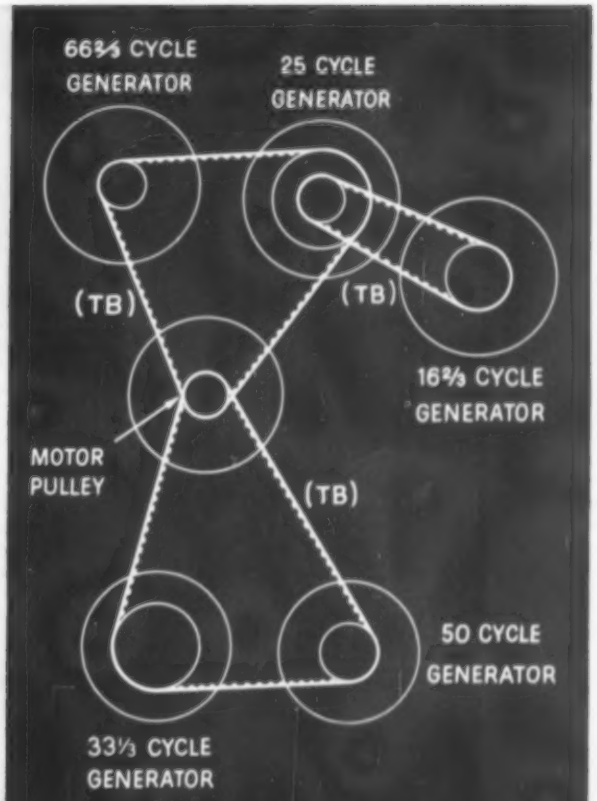

Above is a schematic drawing of a 5-frequency telephone ringing unit on a party-line system. Previously, five motors were needed to generate the different ringing frequencies. But with the installation of just *three* U.S. PowerGrip "Timing" Belts (TB) *only one motor is needed* now. That's because U.S. PowerGrip provides a positive, non-slip grip that preserves the exact speed ratios and the synchronization needed to maintain critical frequencies. And there is absolutely no measurable power loss.

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Table 1.—High Top Pressure Experience in the U.S.

Company	Number of High Top Pressure Furnaces	Average Top Pressure Psi	Effect on Coke Rate	Effect on Flue Dust Production	Increase in Iron Production per cent	Effect on Top Maintenance	Comments
1	11	4½	No change	No change	4.7 to 15.5	Some increase. Bleeders last one year instead of campaign	More benefit derived from fine ore than coarse ore. Beneficiation more economical because of coke saving. 100 lb sinter worth savings of 8 lb of coke charged
2	9	10-11	Little change	No change	12.5	Some increase. Less maintenance at pressures below 5 lb	Pressure makes smoother working furnace
3	1	7½	No change	No change	7.4	Septum valve trouble at higher pressure	Little production increase at pressures above 7½-lb. Furnace had operated up to 12 lb
4	1	7	Some increase	No change	9.1	None	Limited stockhouse equipment prevented furnace being pushed harder
5	2	4½	—	—	—	—	Equipment in use only a short time and no data compiled
6	2	5	—	Less flue dust	Small increase	—	Age of furnace prevents pushing. Operating data not complete
7	2	5	No change	Less flue dust	5.0	More maintenance when pressures are over 5 lb	More uniform operation and analyses

Part 2.—Increasing the Driving Rate

More Iron Without More Furnaces

By CHARLES M. SQUARCY
Superintendent
Blast Furnace Department
and
RICHARD J. WILSON
Assistant Superintendent, Plant 2
Blast Furnace Department
Inland Steel Co.
East Chicago, Ind.

THE VOLUME of wind which can be blown on a blast furnace is a function of voids. To increase the amount of wind blown, it is first necessary to increase the void volume per cubic foot of gas produced. This can be done by the use of sized ore or sinter, or by reducing the volume of gas produced per cubic foot of wind blown.

A blast furnace operating with high top pressure can be blown at a much higher wind rate than the conventional blast furnace with the same raw materials. The generally accepted theory is that more wind can be blown because the volume of gas produced per cubic foot of wind is reduced by higher pressure.

A high top pressure furnace operating at 30 psi blast pressure and 12 psi top pressure should be able to blow 25 to 30 per cent more wind than the conventional blast furnace. The velocity of the gas traveling up the stack would remain identical in both cases. The high top pressure furnace in this case would burn 25 to 30 per cent more coke at the tuyeres.

Experience—Table 1 presents data on furnaces in the U. S. which are equipped for top pressure operation. None uses top pressure with coarse ore.

Operators favor high top pressure. With it, they say, the furnace can be blown at high wind rates, will produce more iron for the same flue dust and coke rate and will generally run smoother for a given burden.

Damper—The limiting factor in the production rate of a blast furnace is the quantity of gas that can pass up the bosh and stack. If too much wind is blown, the gas-solid contact suffers, and the furnace operates as a gas producer.

Sized ore and sinter have resulted in higher production rates, but in most cases the wind rate has been reduced. It is true also that the sensible heat in the blast has been increased by using higher blast temperatures on burdens with sized ore and sinter. But higher blast temperatures increase

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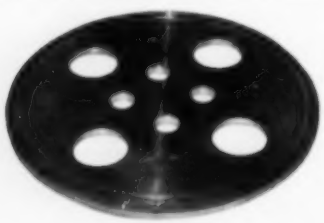

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the volume of gas rising in the bosh, which may explain why the wind reductions are necessary.

Hotter Blast—Sized ore and sinter give more voids, but the effect of lower coke rates, higher blast temperatures and lower wind rates is to lower the fusion zone. Even with the lower fusion zone and the hotter gases, there still may not be enough area for gas flow required. A flooding action may also take place.

The use of higher blast temperatures on straight Mesabi ore is not possible when blowing full wind. They increase the hearth heat available, the bosh gas temperatures and the burden to coke ratio, thus decreasing voids and producing a hanging and kicking furnace. When blowing slack wind, higher blast temperatures can be utilized and the furnace operated smoothly, but during high production periods most furnace plants have available excess stove capacity.

Steam—Controlled injection of steam in the blast has been increasing. Advantages are:

1. More uniform blast analysis.
2. Production of H_2, an active reducing agent for iron ore.
3. A smoother working furnace.

Steam reacts with coke carbon like this:

$$C + H_2O \rightarrow CO + H_2 - 4302 \text{ Btu per pound of carbon}$$

Table 2.—Effects of Oxygen Enriched Blast

	Air Blast	25 per cent Oxygen Blast	30 per cent Oxygen Blast	35 per cent Oxygen Blast
Bosh gas produced when driving rate is held to a constant 960 lb of carbon burned per minute	87,183 cfm	75,680 cfm	65,539 cfm	58,425 cfm
Driving rate in pounds of carbon burned per minute when bosh gas production is held at a constant 87,183 cfm	960	1105	1277	1433

This reaction produces H_2 and CO, both of which are active reducing agents, and it produces two volumes of gas to 1 lb mole of carbon.

Here is the reaction of coke carbon with air:

$$2C + O_2 + 3.76N_2 \rightarrow 2\,CO + 3.76N_2 + 4370 \text{ Btu per pound of carbon}$$

In this case, 5.76 volumes of gas are produced to 2 lb moles of carbon, (or about 30 per cent more than steam produces), but only 34.7 per cent of the gas acts as a reducing agent.

The objection to large volumes of steam in the blast is that the reaction is endothermic, and robs the hearth of heat. Where excess stove heat is available, some steam injection into the air blast should result in improving driving rate or the coke rate, or both.

Oxygen — The theoretical advantages of the oxygen-enriched blast are:

1. Increased driving rate with the same volume of bosh gas (or the same driving rate with less bosh gas).
2. Increased reducing power of the CO because there is no diluting effect of N_2.

Table 2 shows that as the amount of oxygen in the blast is increased the quantity of bosh gas produced decreases. The driving rate of the furnace is constant. The blast temperature would in this case be lowered to counteract the higher flame temperatures. If no consideration of temperature is involved, the driving rate of the furnace could be increased while producing the same volume of gas.

The disadvantage of oxygen-en-

(*Please turn to Page* 104)

Table 3.—Effects of Oxygen Enrichment and Steam Injection

Increase in Driving Rate (Bosh Gas Constant)

Blast Composition	Blast Volume cfm	Bosh Gas Produced lb moles	Heat Generated Btu	Carbon Burned lb per minute	Increase in Driving Rate per cent
Dry air	100,000	319.8	5,820,840	1332	0
23% O_2, 1.9% steam	97,173	319.8	5,820,840	1448	8.7
25% O_2, 3.8% steam	94,676	319.8	5,820,840	1558	17.0
30% O_2, 8.1% steam	89,188	319.8	5,820,840	1790	34.4
35% O_2, 12.1% steam	84,724	319.8	5,820,840	1976	48.3

Decrease in Gas Produced (Driving Rate Constant)

Blast Composition	Blast Volume cfm	Bosh Gas Produced lb moles	Heat Generated Btu	Carbon Burned lb per minute	Increase in Driving Rate per cent
Dry air	100,000	319.8	5,820,840	1332	—
23% O_2, 1.9% steam	89,399	294.2	5,357,755	1332	8.4
25% O_2, 3.8% steam	80,948	273.7	4,983,166	1332	14.5
30% O_2, 8.1% steam	66,356	238.4	4,343,131	1332	25.6
35% O_2, 12.1% steam	57,104	215.7	3,921,672	1332	32.6

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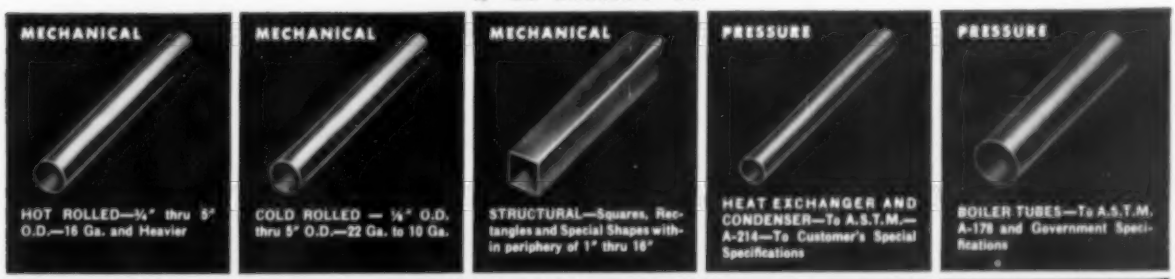
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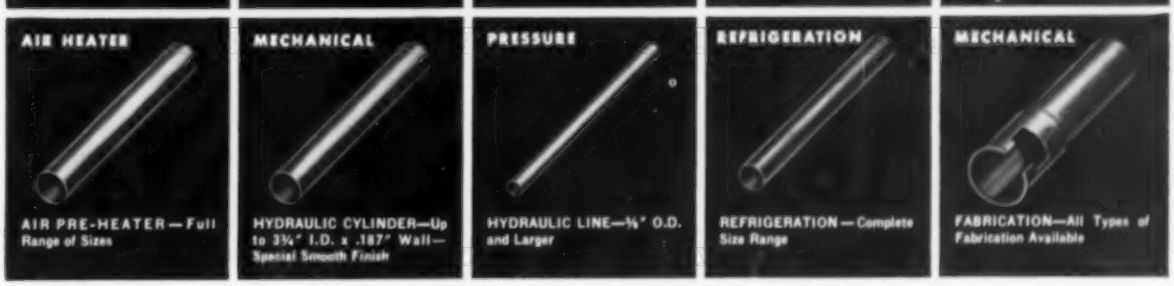

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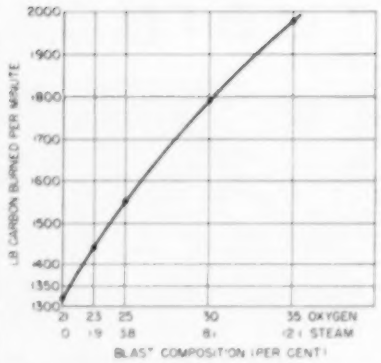

Fig. 1—Effect of oxygen enrichment and steam injection on the driving rate

PROGRESS . . .

(*Continued from page* 101)

riched blast is the higher flame temperature produced. Any appreciable amount of oxygen enrichment will require a low shaft blast furnace, but we are interested in improving production with the existing blast furnace units.

Partnership—Both oxygen enrichment and steam injection increase the driving rate of the furnace. Both increase the reducing power of the gas, while one produces a higher flame temperature and the other a lower flame temperature.

We believe that oxygen-enriched blast and steam injection would combine to drive furnaces faster and generate the same volume of gas per unit time at the same flame temperature (see Figs. 1 and 2). The fusion zone should remain the same; the same raw materials could be used to provide the voids.

Figuring—We have calculated that the combination of 95,258 cfm of 23 per cent oxygen-enriched blast and 1854 cfm of steam would burn 1448.4 lb of carbon per minute, and that 100,000 cfm of dry air would burn 1332 lb of carbon per minute.

The enriched blast would drive the furnace 8.7 per cent faster—8.7 per cent more carbon would be burned per unit time than with normal air.

The volume of gas traveling up the stack, the amount of heat generated in unit time, and the flame temperature would remain unchanged. If heat requirements govern the coke rate, there will be

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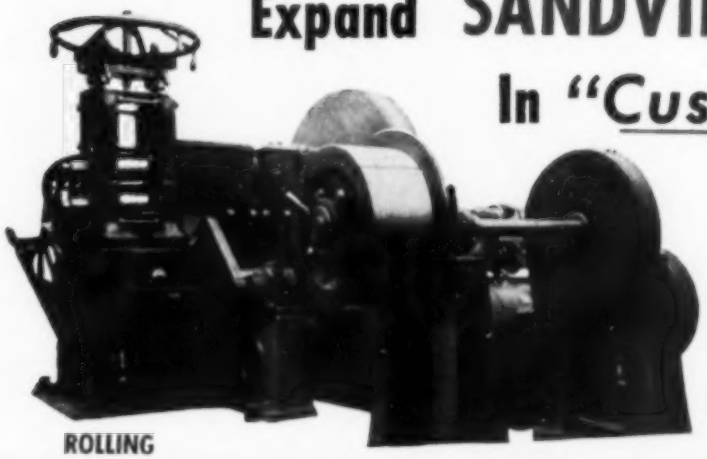

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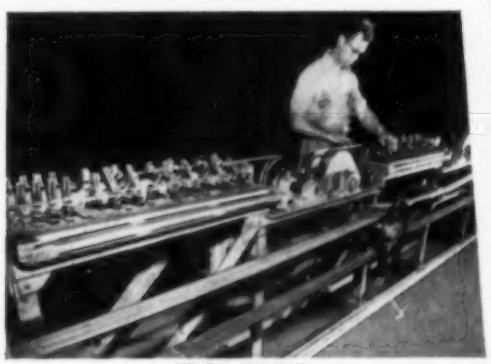

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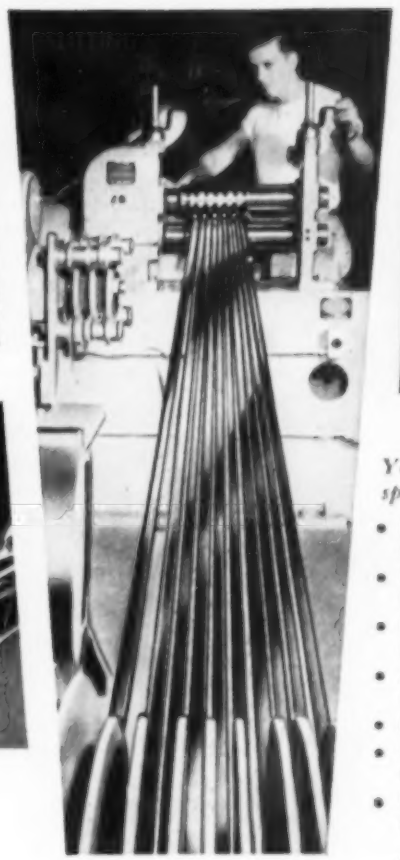

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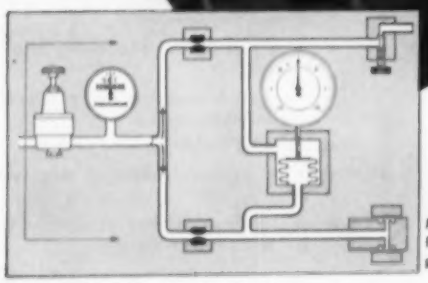

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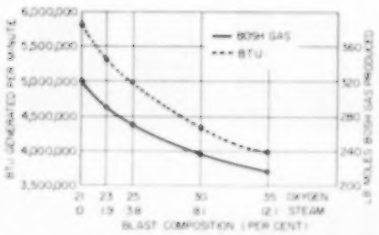

Fig. 2—Effect of oxygen enrichment and steam injection at a constant driving rate

PROGRESS . . .

an 8.7 per cent decrease in the burden to coke ratio. But, if the heat requirement is a function of voids, there should be a decrease in the hearth heat requirements. (There will be an increase in voids owing to the increase in volume the coke will occupy in the furnace.)

So the same amount of gas will flow up through a stock column containing more voids, and heat transfer in the stock column should be increased. The hearth heat requirements will be reduced, and the difference between normal blast burdens and enriched blast burdens will be less than 8.7 per cent. Each per cent less than 8.7 is a per cent increase in production.

Examples—Consider the case of a blast enriched to 25 per cent oxygen and 3.8 per cent steam as against dry air (Table 3). If the gas-solid contact and heat transfer remain the same in both cases, the 17 per cent increase in driving rate will be counteracted by a 17 per cent increase in coke rate and production will remain the same. In this case, the burden to coke ratio will decrease 17 per cent. But, if the driving rate is increased 17 per cent, and the burden to coke ratio decreases only 7 per cent, production will rise 10 per cent.

In the case where the driving rate is held constant (Table 3), the 25 per cent oxygen-enriched air and 3.8 per cent steam produce 14.5 per cent less gas. The enriched blast simulates slack wind operation as far as gas flow is concerned. The furnace could operate at higher blast temperatures and produce more iron.

Equivalents—Fig. 3 shows that increasing the blast temperature

(*Please turn to Page* 110)

Photo courtesy of Caterpillar Tractor Co., Peoria, Ill.

it's only part of the HTM* story...

STRENGTH

High ultimate strength of HTM castings helps the famous Cat D7 Tractor do the tough jobs day-in and day-out. Vital parts, such as the front idler adjusting nut shown, are made from HTM metal . . . the metal with the high ultimate strength that resists wear and fatigue under heavy loads.

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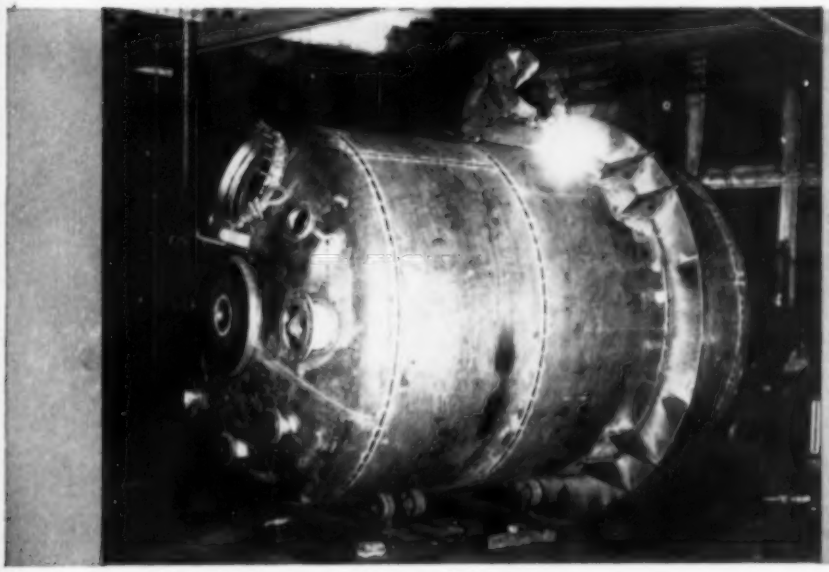
reduces delivery time by one year

—New Jersey fabricator uses CF&I NICKEL PLATED STEEL PLATES for caustic evaporator



A welder at the L. Lawrence Company puts the finishing touches on an 8-foot diameter caustic evaporator. Heads and plates are all fabricated from CF&I Lectro-Clad, nickel plated on all inside surfaces for protection against contamination. Rolling, shearing and severe forming of Lectro-Clad are easily accomplished, using normal steel fabricating methods — the nickel plating *will not* check, spall or flake.

■ Instead of waiting a year for hard-to-get, expensive nickel, the L. Lawrence Company, Inc., of Newark, New Jersey used ⅜-inch steel plates with a .015-inch, Lectro-Clad nickel plating in making a caustic evaporator for a large chemical company. Results—a completely successful evaporator . . . *at lower cost . . . delivered a year sooner than expected . . . fabricated with standard procedures.*

The Lectro-Clad nickel plating on the inside surface of the evaporator does the same job as solid nickel or nickel-clad steel in protecting against discoloration and contamination . . . the carbon steel plates give structural strength and durability. What's more, you can expect plate delivery in six weeks when you order CF&I Lectro-Clad.

If you use, or fabricate, heavy industrial equipment where product contamination is a problem, you can probably use CF&I Lectro-Clad to good advantage. For further details, write for the Lectro-Clad Technical Manual, Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware. 4373

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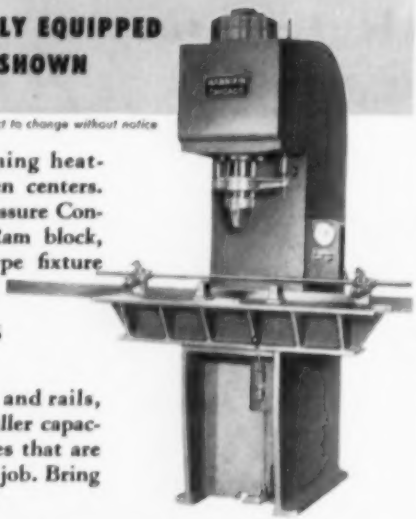

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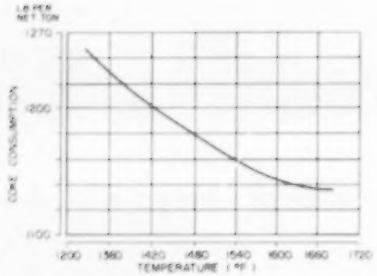

Fig. 3—Coke consumption as a function of wind temperature

PROGRESS . . .

(Concluded from page 107)

by 100°F is equivalent to 60 lb of coke per net ton of iron at 1300°F, and 19 lb at 1600°F. Blast temperatures of American blast furnaces, operating on Mesabi ores, generally average 900 to 1100°F. If this average could be increased to 1200-1400°F, the saving in coke rate would be approximately 180 lb per net ton of iron. This would amount to over a 10 per cent decrease in coke rate.

The above method for increasing production is, of course, only applicable to furnaces operating at maximum wind rates, and with high coke rates as a result of poor gas-solid contact.

Exothermic—There remains the additional consideration of the exothermic reaction in the reduction of iron with CO and H_2. There is approximately 6 per cent more heat liberated when FeO is reduced by hydrogen than when it is reduced by carbon monoxide. This heat will not counteract that taken away by the endothermic reaction of steam and carbon, but it will reduce the heat differential generated by burning carbon with air and with steam.

The economics of using a combination of oxygen and steam in the blast will be the determining factor. The cost of oxygen, including amortization of the plant, will have to be counterbalanced by the increased production of the furnace. The waste gas produced will also have a higher heating value.

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How To Use the Parker Appliance Inspection System

These four tables were developed to help Parker's inspectors approximate a lot size and gaging frequency for an operator. Many drilling operations fit into the pattern. Other tables were developed for milling, grinding and similar machining operations.

You will need this information to use the tables: 1. Type of machine. 2. Type of tool. 3. Tolerance. 4. Part material. 5. Tool material. Here is an example:

Machine—Drill Press.
Operation—Drill a low-value part.
Size—0.263 to 0.268 in. (0.005 limit)
Tool—Carbide-tipped drill.
Material—Aluminum.

Table I Machine: Drill Press. Tool: Drill

Diameter of drill	Lot Size 500	100	25	10	5
	Limits				
1 in. & over	0.020	0.010	0.007	0.005	0.003
¼ to 1 in.	0.005	0.008	0.005	0.003	0.002
1/16 to ¼-in.	0.010	0.004	0.003	0.002	0.001
up to 1/16-in.	0.005	0.003	0.002	0.001	0.0005

Table II Type Material: Soft, Nonferrous

Lot Size from Table I 500	100	25	10	5
New Lot Size				
1000	500	100	25	10

Table III Type of Tool Material: Carbide Tipped

Lot Size from Table II 1000	500	100	25	10
New Lot Size				
5000	2500	400	75	25

Table IV Cost of Part: Low Cost

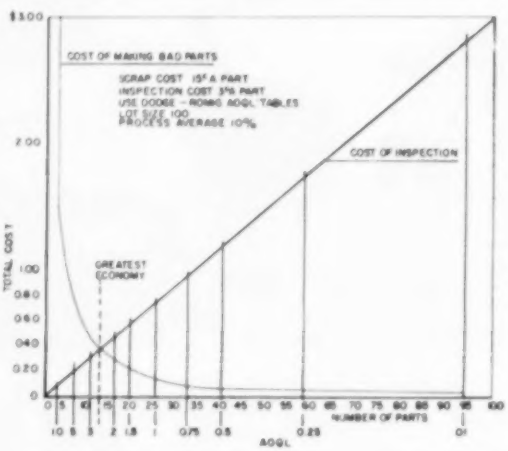
Lot Size from Table III 5000	2500	400	75	25
Gaging Frequency*				
240	125	22	5	2

*Expressed as gage one part in five, etc.

Referring to Table I, the lot size is 25; in Table II, 100; in Table III, 400. Table IV gives the gaging frequency as one part in 22.

To check the efficiency of your inspection plan, make a graph like this one. You need to know:

1. The scrap cost of a part. 2. Cost of inspection. 3. The lot size you've chosen. 4. The process average.



Find the cost of inspecting the entire lot and plot the point. Connect it with zero. In the example, it costs $3 to inspect the lot.

Use the Dodge-Romig tables (they are available at most bookstores) to locate the AOQL ordinates. Process average of the example is 10 per cent; each ordinate is found on a separate table. Lot ordinates (0 to 100) coincide with AOQL.

Plot a curve like the one shown. Using 3.0 as an example, 3 per cent of 100 equals three scrap parts; cost is 45 cents.

The diagonal and curve intersect at the point of greatest economy.

Quality Control at Operator Level

By JOSEPH D. SHAFFER
Parker Appliance Co.
Cleveland

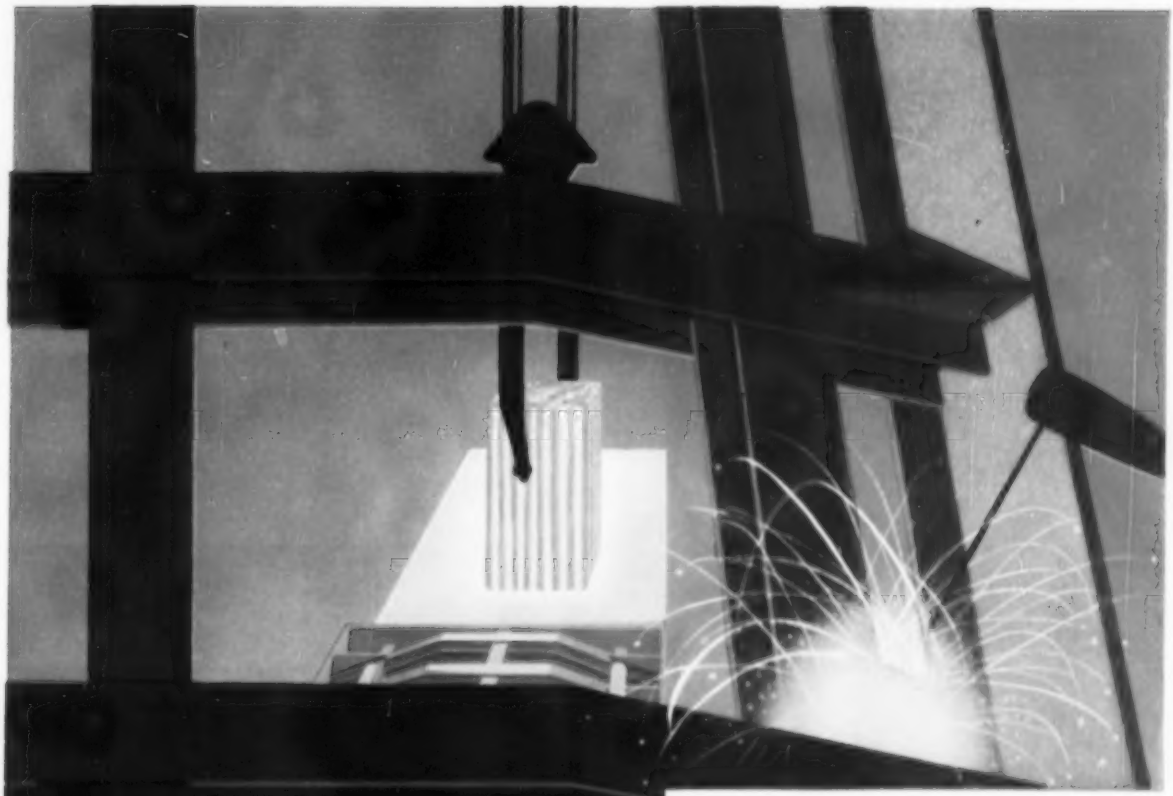
MACHINE operators can use the simplified inspection system developed at the Parker Appliance Co., Cleveland.

All that's needed is a little experience, a graph and four charts. Your inspectors can probably develop them without difficulty.

Quality Level—To use the system, decide how much quality you want. (It's called the average outgoing quality level or AOQL.) Sometimes it is determined by a contractual agreement between you and the customer. Shop AOQL should be a little tighter.

The kind of quality you consider acceptable can be based on other considerations. One such consideration might be the cost of inspection compared with the cost of scrapping a part.

Details—To find the gaging frequency, you must decide on lot



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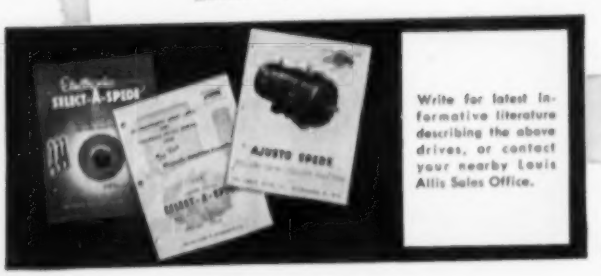

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size. A new one is started every time a tool is reset. The answer is closely related to tool life and to machine capability. The most exacting jobs require small lot sizes; larger lots are good enough for less exacting parts.

The solution is to break down an operation into its components (tolerance, tool size and material, part material and cost) and weigh their effects on cost. Close tolerances call for more frequent gaging. Soft materials like nonferrous metals which are easy on tools, reduce the amount of gaging. Carbide tools wear longer than those made of tool steels, and tolerances can be held longer. Cheaper parts don't need to be gaged as frequently as expensive ones.

Operator—The four tables (page 112) are based on those factors. Together with a graph, inspectors or production personnel can determine how often a machine operator should check one part from his production. It's a good idea to have the process engineer put the data on the blueprint.

The system is a natural for those who have difficulty deciding inspection frequencies. Continuous sampling (charting) is often left to the judgment of several persons; conflicts between shifts or supervisors are often the result.

Where critical or vital statistical sampling isn't an issue, the system works satisfactorily.

System used at Parker puts operators on quality control team

Operator at Bell Aircraft machines a small wheel on a pantograph engraving machine. Template, on upper table at rear of the machine, is ten times the size of the part—errors in the template are reduced to a tenth on the part

Pantograph Goes Production

PANTOGRAPH engraving isn't usually thought of as a production process. At Bell Aircraft Corp., Buffalo, it's the ideal answer to a tricky production job.

The part is a four-spoke wheel 3¾-in. in diameter. It is machined from a disc of AISI 4340 steel, which is heat treated to a tensile strength of 180,000 to 200,000 psi.

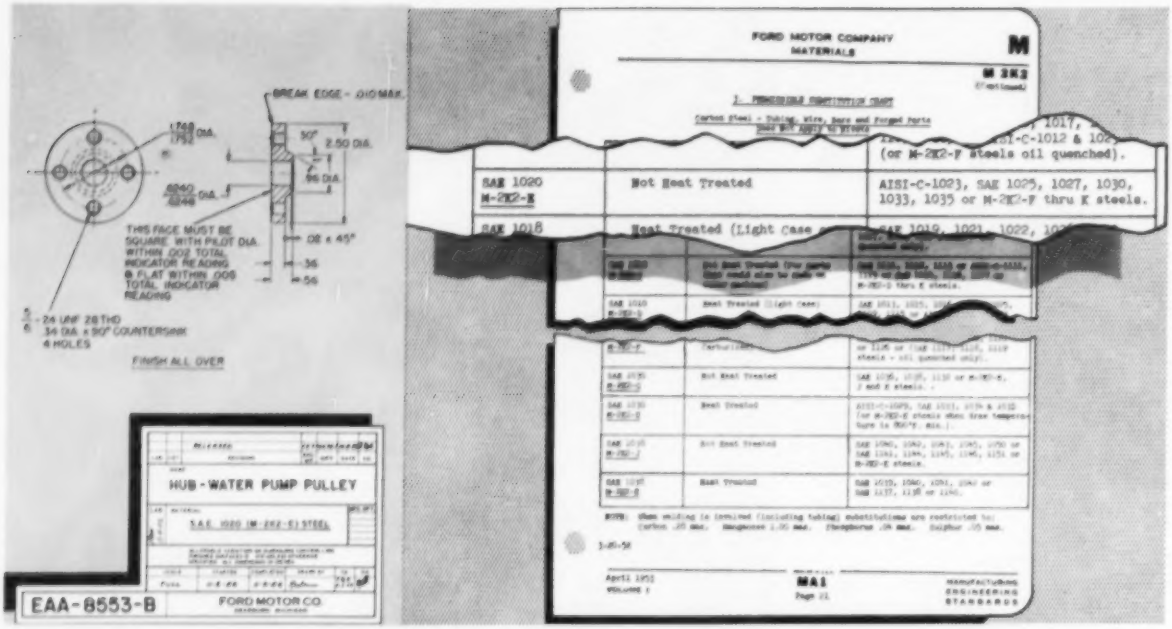
Elmer C. Fulton, who is with Bell's precision valve shop, Wheatfield plant, says the wheel used to be machined in a small vertical miller equipped with a rotary table. He adds: "Production was slow, expensive and fatiguing. The rejection rate was high because machining stresses frequently cracked the thin webs and because contours were not blended smoothly. Blueprint tolerances were difficult to maintain, particularly where direction of feed was changed."

Study — The combination of problems faced Bell's tool and production engineers. They concluded that the part could best be made on a two-dimensional pantograph engraver.

With the new setup, production is four times what it was. Scrap loss has been slashed to less than 1 per cent. And Mr. Fulton points out that the job is easier for the operator to handle.

Reduced Error—The master template developed at Bell is exactly ten times the size of the part. It reproduces the radiuses and contours to be cut. Any error in the template is reduced ten times in the part as it is machined.

Two follower rollers were made for this job, Mr. Fulton says. Both use standard roller bearings mounted on 0.250-in. shafts. As the smallest radius to be machined on the part is 0.125-in., the roughing roller was made 1.310-in. OD. The finishing roller is 1.250-in. Since 0.250-in., high-speed-steel end mills are used for both roughing and finishing cuts, 0.003-in. of stock is left for removal during finishing cuts.



The hub (left) is specified for SAE 1020 steel, but the M-2K2-E substitution chart (right) permits the use of any one of 12. Alternates are shown in the enlargement, give suppliers flexibility

Write Savings Into Specs

Use materials more efficiently through better design, processing and standardization. Here's how Ford cuts costs by controlling its specification of metallurgical requirements

COST reduction is a prime purpose of specifications.

The buyer who handcuffs his supplier with specs may have to pay a premium just to stay in business even though adequate substitutes are available, Joseph Gurski, assistant manager, Manufacturing Research, Ford Motor Co., Dearborn, Mich., told the American Standards Association in New York last month.

Here are some of his suggestions on how you can get more from your specifications.

Flexibility—During the last few years, changes in pricing have added 10 to 15 per cent to the base cost of steel. More than ever before, metallurgists must be dollar wise.

Most specification experts know the benefits of standardization and simplification. To achieve them, here are some of the rules they use:

1. Improve the design—Ford conducts a never-ending search for a simpler part to do the job.

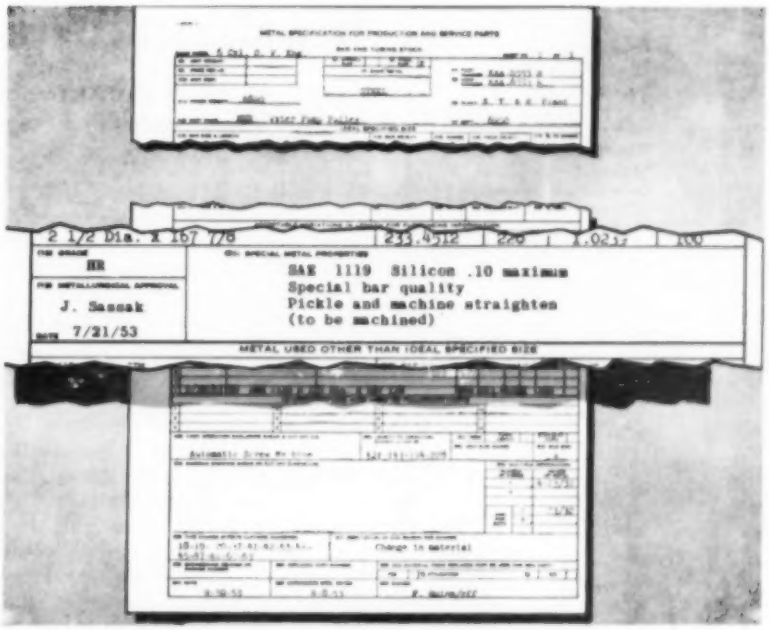
2. Reduce processing—Ford engineers decided that stock for piston pins had to be pickled and oiled. They found that machining would remove a lot of scale. Omission of pickle and oil requirements saved $24,500 a year.

3. Make more standard parts, increase interchangeability — reducing the variety of fasteners, for example, will increase the volume of a few, bringing savings through bigger purchases and a simpler inventory.

4. Review metallurgical requirements—a Ford specification said that an alloy steel had to be 300 Brinell. Respecifying it as "suitable for cold shearing and punching" saved $330,000 a year.

Division—The responsibility for parts in a Ford lies with product engineering and manufacturing. Product engineers are vitally concerned with adequate designs; manufacturing wants to standardize, simplify processing and reduce its costs.

In automotive manufacturing, timing is important. Designers don't have much opportunity to review specifications after drawings are released. By the time tooling has been made and parts



What Flexible Specifications Mean to Ford

	1949	1956
Number of Parts Being Produced	380	1472
Number of Specs Required	365	542
Specifications Eliminated		873
Annual Savings		$327,375

are tried out, manufacturing needs them for production models.

Leeway—The best solution is to allow the manufacturer more latitude in the selection of materials. One device Ford uses is called the M standard.

For example, the physical requirements of bolts and nuts are given in standards M-3500-A through H. They list the steels that can be used interchangeably. One (M-3500-A) lists AISI C-1013, SAE 1015 through 1020 and 1022.

Here's how that works.

Ford makes 44 bolts from C-1013 steel in nine wire sizes. Instead of ordering nine, it buys a single size rod and draws its own sizes as they're needed. Had the steel been specified for each bolt, as many as six different types could have been ordered. The M-specification was written so that the manufacturer could order a single size and a single type of steel rod.

Another Example — Take the Recommended Practice Specification. Here is how it works for carbon steels.

The introduction to M-2K2 says that the specification is intended to permit the widest latitude possible consistent with engineering requirements (see below).

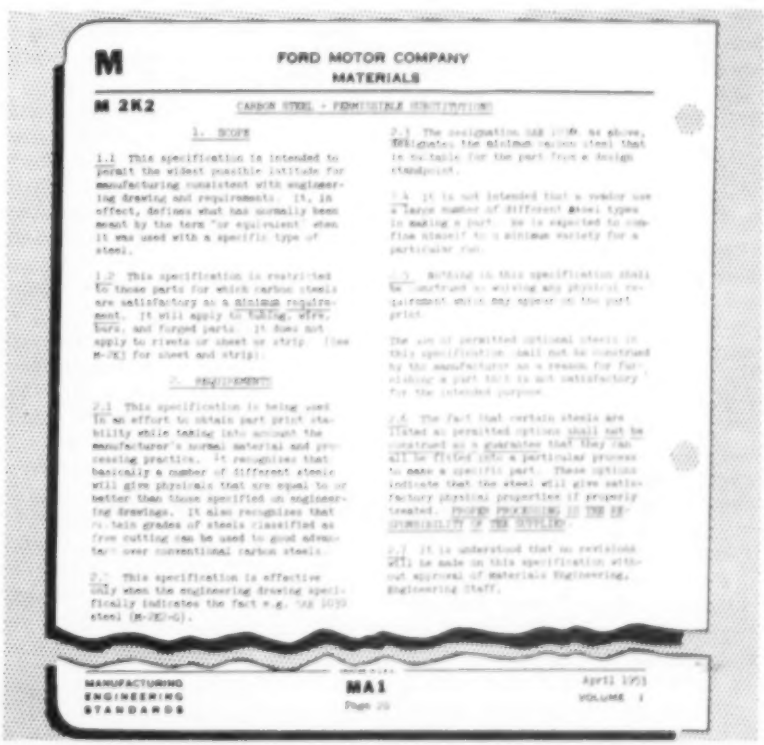
In the next paragraph, the requirements recognize that several steels can satisfy the same purpose, including the free cutting varieties. In one case (SAE 1020), 29 substitutes can be used.

With that kind of freedom, manufacturing doesn't need to bother engineering for permission to use alternates, nor does it have to wait 60 days for a blueprint change.

Metal Specs — Since drawings don't specify exact requirements, Ford uses another form to keep its finger on the materials it needs. It's called a metal specification and gives details like size, tolerance, shipping instructions, packing information and metallurgical data. When requisitions are issued, purchasing uses the spec sheet (left) for its authority.

Here are some examples Mr. Gurski cited. They illustrate how greater latitude works for lower costs.

Piston pins used to be made from tubing. When Ford went to


M

FORD MOTOR COMPANY
MATERIALS

M 2K2

CARBON STEEL - PERMISSIBLE SUBSTITUTIONS

1. SCOPE

1.1 This specification is intended to permit the widest possible latitude for manufacturing consistent with engineering drawing and requirements. It, in effect, defines what has normally been meant by the term "or equivalent" when it was used with a specific type of steel.

1.2 This specification is restricted to those parts for which carbon steels are satisfactory as a minimum requirement. It will apply to tubing, wire, bars, and forged parts. It does not apply to rivets or sheet or strip. (See M-2K3 for sheet and strip).

2. REQUIREMENTS

2.1 This specification is being used in an effort to obtain part print stability while taking into account the manufacturer's normal material and processing practice. It recognizes that basically a number of different steels will give physicals that are equal to or better than those specified on engineering drawings. It also recognizes that certain grades of steels classified as free cutting can be used to good advantage over conventional carbon steels.

2.2 This specification is effective only when the engineering drawing specifically indicates the fact e.g. SAE 1020 steel (M-2K2-G).

2.3 The designation SAE 1020, as above, designates the minimum carbon steel that is suitable for the part from a design standpoint.

2.4 It is not intended that a vendor use a large number of different steel types in making a part. He is expected to confine himself to a minimum variety for a particular run.

2.5 Nothing in this specification shall be construed as waiving any physical requirement which may appear on the part print.

The use of permitted optional steels in this specification shall not be construed by the manufacturer as a reason for refusing a part that is not satisfactory for the intended purpose.

2.6 The fact that certain steels are listed as permitted options shall not be construed as a guarantee that they can all be fitted into a particular process to make a specific part. These options indicate that the steel will give satisfactory physical properties if properly treated. PROPER PROCESSING IS THE RESPONSIBILITY OF THE SUPPLIER.

2.7 It is understood that no revisions will be made on this specification without approval of Materials Engineering, Engineering Staff.

MANUFACTURING ENGINEERING STANDARDS

MA1

April 1953
VOLUME 1

Specification (left above) is substitute one Ford department chose for the hub (opposite page). Standards page immediately above is described in the text

A.S.A. B32.1 contains 61 sizes
Simplified Ford standard contains 24 sizes
96 per cent of Ford steel is purchased in 14 sizes

Standard A.S.A. Preferred Thickness	Simplified Ford Standard	Standard A.S.A. Preferred Thickness	Simplified Ford Standard	Standard A.S.A. Preferred Thickness	Simplified Ford Standard
0.236	0.236	0.075	0.075	0.022	
0.224		0.071		0.021	0.021
0.212	0.212	0.067		0.020	
0.200		0.063		0.019	
0.190		0.060	0.060	0.018	0.018
0.180	0.180	0.056		0.017	
0.170		0.053		0.016	
0.160		0.050		0.015	0.015
0.150	0.150	0.048	0.048	0.014	
0.140		0.045		0.013	
0.132	0.132	0.042	0.042	0.012	0.012
0.125		0.040		0.011	
0.118	0.118	0.038		0.010	0.010
0.112		0.036	0.036	0.009	
0.106	0.106	0.034		0.008	0.008
0.100		0.032	0.032	0.007	
0.095		0.030	0.030	0.006	0.006
0.090	0.090	0.028		0.005	
0.085		0.026	0.026	0.004	
0.080		0.024	0.024	0.003	

bar stock, it thought it needed raw material of piston pin quality because stock diameter was close to that of the finished piece. The company removed the quality requirement, specified magnetic testing, increased the ordering size 0.010 in. Taking a calculated risk that it could machine off any surface imperfections saved Ford $50,400 a year.

Changing the material specs for a frame reinforcing plate from special to merchant bar quality saved $8500 a year.

Preferred—The engineering department at Ford uses a standardizing medium for flat metals. Called preferred sizes, it eliminates confusion and drastically reduces the amount of time spent in writing specifications.

For a long time, industry has been handicapped by a variety of gage systems. For example, 20 gage thickness ranged from 0.032 in. (Brown & Sharpe) to 0.1732 (French).

Ford turned to the American standard. Engineering drawings that used to spell out "No. 20 MS gage (0.0359 in.)" now read "0.036 in. thick." Consider how much is saved on 25,000 drawings a year.

In 1949, Ford had 365 metal specifications for 380 parts. In 1956, it has 542 specs for 1472 parts. Standardization reduced the number of specifications needed per part. Since it costs about $25 to process each part, annual savings amount to $327,375.

Do It Yourself—Here is an example of what can be done by combining several sheet sizes and shearing your own.

Ford once bought five small strips in sizes ranging from 4 3/32 x 75 in. to 7 35/64 x 36⅞-in. Warehouse cost was $0.085 per pound. By combining all the small sizes into regular sheets, it was possible to purchase all the requirements from a mill at $0.053 per pound. Savings: $11,712 a year.

There are many more areas in which there is room for savings. To find them, look for a reduction in variety; find means of standardization and simplification.

Expect to meet opposition—some individuals have to be persuaded to change their ways.

"But," concludes Mr. Gurski, "the results are well worth the effort. No company can afford to neglect such opportunities for savings."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

New Magnetic Drive

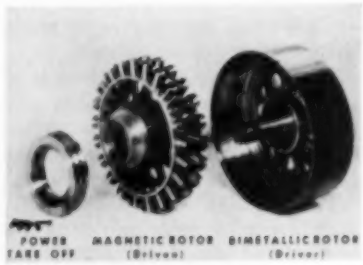
Slip type unit protects driving motor, insures smooth pickup on heavy, fluctuating loads

A NEW approach to problem drives is in the offing, predicts Whitney Chain Co., Hartford, Conn. The company has completed a licensing agreement with Tormag Transmissions Ltd., Canada, to produce a line of magnetic drives and, eventually, variable speed reducers.

The Whitney-Tormag magnetic type will provide a slip drive between a motor and its load to insure smooth pickup for heavy, unbalanced or fluctuating loads.

How It Works—The unit has two parts: 1. A magnetic rotor (a cylinder with permanent magnets). 2. A bimetallic rotor (a mild steel plate with a copper facing or a cylinder perforated with steel rivets).

The rotors are mounted face-to-face with air space between. If either rotor is driven, a torque is induced in the other through eddy currents. The driving and driven rotors are never in contact.



DRIVE UNIT
. . . has permanent magnet rotor

Plusses—The magnetic drive provides complete protection for the driving motor. It can be run in full stall (100 per cent slip) indefinitely without harming the motor or the magnetic drive. Efficiency at rated horsepower is 95 per cent. The drive is reversible and can be used as a dynamic brake.

Whitney hopes to have standard units (1 to 5 hp) by the first quarter of 1957. Typical applications: Torque control on wire drawing machines, wire and rope stranding, construction and textile machinery, machine tools and conveying equipment.

The Falk Corp., of Milwaukee, also uses Elastic Stop nuts in the tie rod assembly . . . and on the gear housing to maintain tight cover fit.

Elastic Stop® nuts solve critical gear adjustment problem in new speed-reducing unit!

In its rugged new Shaft-Mounted Drive, The Falk Corporation uses a self-locking Elastic Stop nut to secure the high-speed gear to the intermediate shaft, as shown in the illustration on the left.

The precision-made Elastic Stop nut stays firmly in place and the close seat-squareness tolerances maintain the exact original gear adjustment withstanding severe vibration caused by shock loads transmitted through the gears. Costs are cut because drilled bolt holes and cotter pins are eliminated.

Here's how this Elastic Stop nut works: The familiar red collar of the Elastic Stop nut is deliberately undersized in relation to the shaft (or bolt) diameter. It grips the shaft with a perfect fit, enforces a continuing self-locking pressure against the metal threads, and holds the nut securely in place at the desired point on the shaft. This same tight-fitting locking collar also provides a seal that prevents oil from seeping along the bolt threads, wherever oil seepage is a problem. And because the bolt threads are protected against moisture from without, the nuts cannot become "frozen" to the bolt by corrosion. The elastic recovery of the red collar permits extended re-use of Elastic Stop nuts.

Mail the coupon for information on how Elastic Stop nuts can solve your specific fastening problem.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA® TRADEMARK

ROLLPIN TRADEMARK

Elastic Stop Nut Corporation of America
Dept. N67-1160, 2330 Vauxhall Road, Union, N. J.
Please send the following free fastening information:

☐ ELASTIC STOP nut bulletin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

The converted Michigan 175A approaches the car dumper with a loaded car. The empty is pushed out, rolls down a grade to a siding

Tractor Makes Speedy Switch Engine

BRUTE strength and speed of a tractor shovel, plus ingenuity, solved a handling problem at Kaiser Steel Corp.'s Fontana, Calif., steel mill.

The problem: To speed up car handling to match the production of three blast furnaces and nine open hearths.

The solution: The shovel from the front end of a 175-A Michigan tractor shovel was removed and replaced with a railroad car switching toggle mounted on a heavy spring-loaded plate. Another heavy pusher plate was mounted on the rear. The final step was to ballast the railroad tracks with sand and crushed rock almost to track level. This provided adequate traction for the machine's rubber tires.

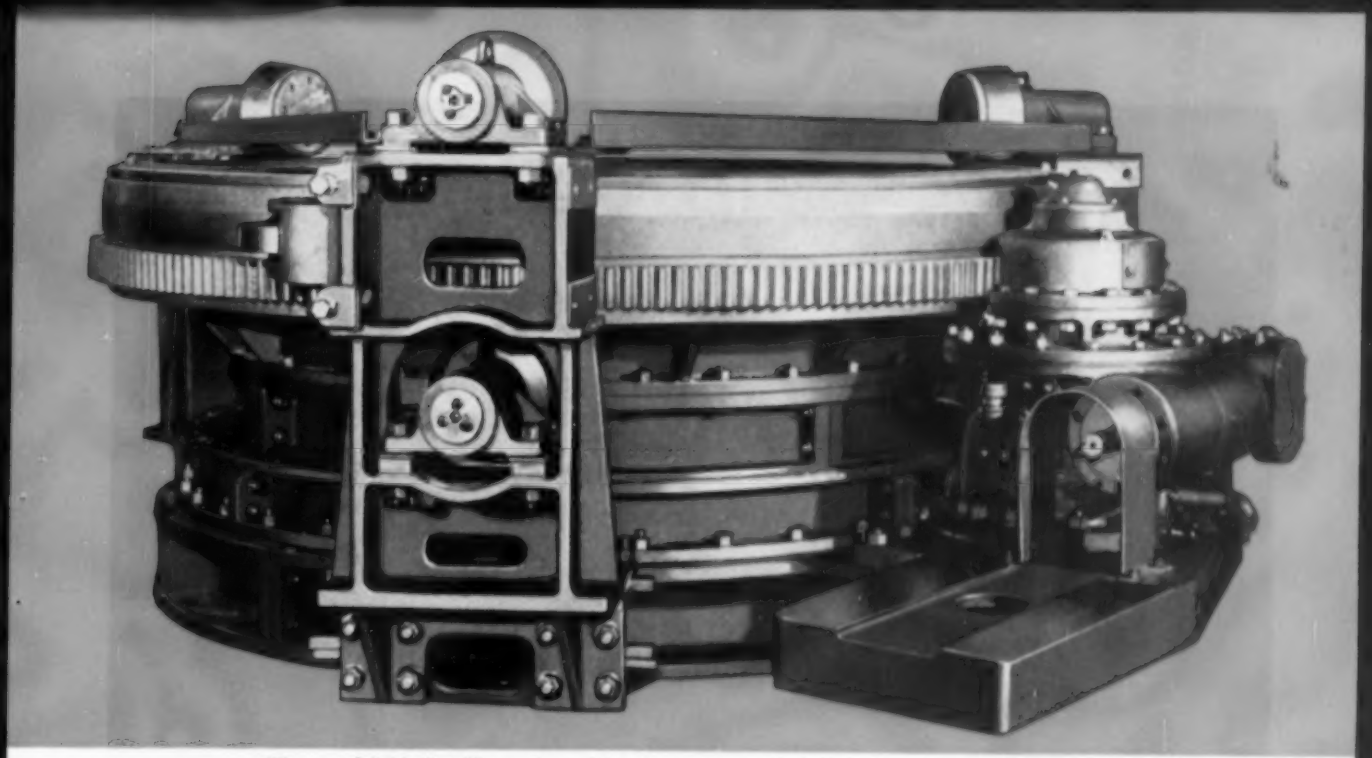
The pushing plates are two, 2 in. plates with five to seven railroad coil springs placed between to cushion shocks.

Operation—Cost savings show up best on the handling of gondola cars loaded with ore for the feeder hopper. Between 6000 and 7000 tons are handled daily. Cars are fed into a revolving dumper which picks up the car, revolves it, then returns the car empty in about a minute.

The sequence is like this: A trainload of ore is spotted approximately 150 ft from the unloader. The converted tractor hooks onto a full car, pulls it into place on the unloader and returns for another while the unloader is operating. As the tractor pulls the second car into place, it nudges the first car out of the unloader.

Empty cars roll to a downgrade and travel under their own momentum to a make-up track. Empties are coupled automatically and, except for air hose connections, are ready for the return trip.

The tractor has plenty of power. The pusher plates are left and right



New model McKee Heavy-Duty Distributor* ready for installation of revolving hopper.

NOW... a new McKee Distributor with Heavy-Duty features

for smaller Blast Furnaces

FOR fifty years the McKee Distributor has been virtually standard equipment throughout the industry. With the advent of modern, large-hearth-diameter furnaces McKee designed the large Heavy-Duty Distributor which has proved so successful on the newer furnaces. This year McKee produced a new intermediate model incorporating the best features of the large heavy-duty model in a distributor recommended for "high-pressure operation" on smaller, existing furnaces. Five of the new units are already in operation and three others are now being installed. Both Heavy-Duty models are also available with a special seal for high-speed operation without appreciable increase in horsepower requirements.

Heavy-Duty design assures you lower maintenance . . . improved, uninterrupted performance

TRIPLE, GREASE-LABYRINTH GAS SEAL with improved, resilient packing in contact with a smooth, hard-chrome-plated surface. Experience with this same seal on the large McKee Heavy-Duty Distributor indicates that not more than one packing change is required during the campaign of a blast furnace.

RUGGED, MANGANESE-STEEL BELL SEAT is easily accessible by removing the revolving hopper only, without disturbing ring gear, rollers or seal.

THREE ROLLER STANDS support top, bottom and side rollers in a compact design which provides maximum accessibility for inspection and maintenance.

WEAR IS REDUCED by distributing loads over wider ring gear and pinion faces, larger roller and roller track insert surfaces.

ROLLER BEARINGS of liberal size in top, bottom and side rollers, bell rod support and drive unit are sealed against dirt.

AMPLE SAFETY MARGIN is provided by heavy construction, with every part designed to withstand far more than maximum expected load.

*PAT. PEND.

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WHEELABRATOR® SUPER TUMBLAST

makes cleaning dollars go twice as far at INDIANA FORGE and MACHINE CO.

Automatic batch type cleaning is a reality at Indiana Forge & Machine Co., East Chicago, Indiana where a Wheelabrator Super Tumblast operates without any direct labor. This revolutionary, new airless blast cleaning machine cleans twice the volume of steel and alloy steel forgings in half the time formerly required by two conventional blast machines.

The entire operation is controlled by an automatic timer which is put into action by the trucker by simply pushing a starting button after charging the loader. This not only saves direct labor but helps to compound the savings inherent in the design and construction of the Super Tumblast.

For example, the machine operates only as long as necessary to achieve the cleaning required. The timer permits tumbling of the work to clear pockets and cavities of abrasive. The shaker type conveyor used in unloading is another safeguard against abrasive carryout. Its perforations permit abrasive to fall through into a reclamation device, and thus keep abrasive consumption to a minimum.

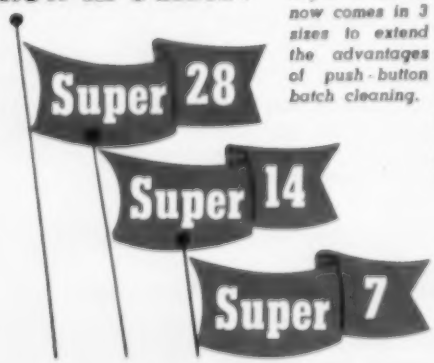
Abrasive costs have been reduced 68% at Indiana Forge & Machine Co. The first set of blades ran 596 hours and no other wearable part has as yet been replaced.

And now Wheelabrator has made these advantages available for more applications by adding two smaller size units to its Super Tumblast line. Whatever your production, there's now a Super Tumblast model to bring you super savings in cleaning costs through increased productivity and automation.

Send for CATALOG 125-D

NOW in 3 sizes!

Super Tumblast now comes in 3 sizes to extend the advantages of push-button batch cleaning.



WHEELABRATOR
CORPORATION
509 South Byrkit Street Mishawaka, Indiana

Distribution System Automates Machine Tools

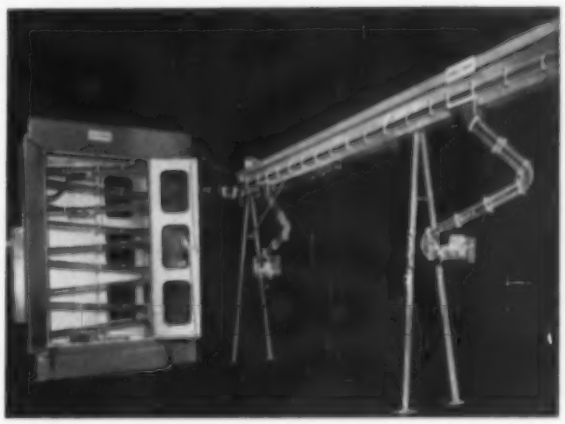
Without synchronization and alteration of standard machine tools, you can do completely automatic manufacturing with the demand feed distribution system. It links tools into an integrated line.

Parts can be moved through the line either in series or parallel.

Each machine tool is supplied at its own demand rate. This is true whether all or only some of the tools are operating.

Elastic floats are provided to even the flow of parts through the line and absorb the differences in productive capacities between successive machine operations.

Controls of the system are made of standard components and are independent of the machine controls. *Write*: Cargill Detroit Corp., 2254 Cole Ave., Birmingham, Mich. *Phone*: Midwest 4-5400



Caustic Etchant Bath Brightens Aluminum

The 85S cleaner etches aluminum evenly.

Formation of scale on tank walls and coils is eliminated by an inhibitor. Formation of sodium aluminate (an etching inhibitor at high concentrations) is minimized so use of the caustic soda is at a maximum.

As sodium aluminate builds up, the etchant concentration is increased—it always exceeds the sodium aluminate concentration.

By maintaining the excess etchant content, the bath can be operated for long periods without dumping.

Hydrous aluminum oxide settles out in the form of sludge.

Dumping is necessary only when sludge becomes excessive. *Write*: Hanson-Van Winkle-Munning Co., Matawan, N. J. *Phone*: Matawan 1-1000

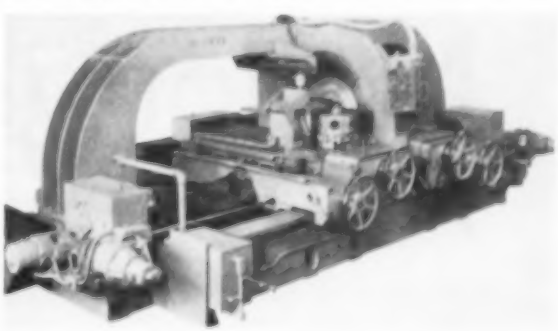
Center Drive Lathe Faces Diameters up to 44 In.

Parts such as turbojet engine discs are profile faced by this lathe.

Cutting tools, mounted on opposite sides of the workpiece, turn both sides simultaneously.

Rough, semifinishing and finishing passes have been made on parts having a diameter of 22 in. and a thickness of 0.0029 in. Parallelism: 0.001 in.

Spindle speed is controlled for constant surface speed. The lathe eliminates the "dishpan" effect often found in thin sections. *Write*: Wickes Machine Tool Division, Wickes Corp., Saginaw, Mich. *Phone*: Pleasant 2-6126



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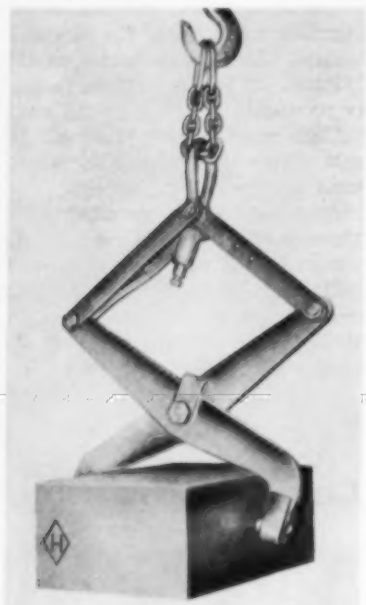
NEW PRODUCTS and equipment

Automatic Tongs

Die blocks and other square, round and rectangular objects are lifted by these general purpose tongs.

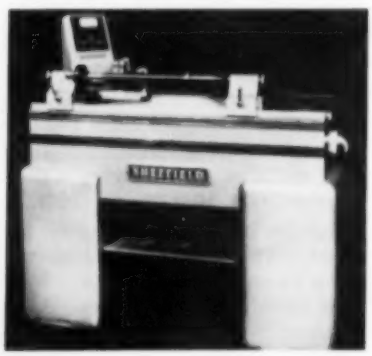


One pair, for loads up to 3000 lb, has a maximum jaw opening of 18¼-in. Maximum jaw opening of a pair for loads up to 5000 lb is 25 in.

Jaws close when the tongs are being lifted and release when the load is rested on a firm surface. *Write*: Heppenstall Co., New Brighton, Pa. *Phone*: Mayflower 1-2000

Lead Measuring

The Leadcek is an electronic instrument that detects the lead error in rack teeth and straight and tapered work. Direct read-



IT'S BETTER IF IT CONTAINS MOLY

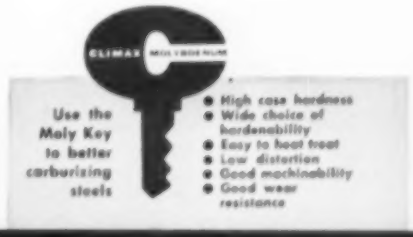
Up to 1% Moly in carburizing steels gives required hardenability economically

Why limit the use of molybdenum to the .15/.25% Mo and .20/.30% Mo contents of the traditional grades? For the contributions of moly do not stop there. Laboratory tests and production runs prove that as molybdenum contents increase up to 1%, hardness increases progressively. A wide range of case and core hardenabilities, therefore, can be obtained – economically, too.

Tests with a series of molybdenum-manganese steels show that these compositions give higher case hardness on a direct quench than other steels of comparable core hardenability. One extensively tested composition, for example, is 0.5% Mo – 0.5% Mn steel. It shows longer life, and is lower in cost than steels previously used. And it produces a higher case hardness with similar or less distortion. What's more, tool life and surface finish are equal or better. Good reasons why several companies have already adopted this grade for automotive gears and other critical applications.

If you use carburizing steels, see what a higher molybdenum content can do for you. Part of the story is contained in the technical article "New Carburizing Steels For Critical Gearing." For your copy, or other technical data, write Climax Molybdenum Co., Dept. 3, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM



ings to 0.00001 in. can be made.

Work up to 36 in. long and 10 in. in diameter can be handled with standard tailstocks. *Write*: Sheffield Corp., Dayton 1, O. *Phone*: Kenmore 3131

Liquid Detergent

Liqui - Det is a concentrated cleaner that forms a lot of suds in hot or cold hard or soft water. It can be used repeatedly without rinsing. There is no discoloration or build-up of film. Concentrations are as low as ¼-oz to 1 gal of water. *Write*: Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940

Boring Machine

This two station, double end machine simultaneously bores two holes (in line) in cast iron differential cases. They are straight and round to within 0.0005 in. Production at 100 per cent efficiency is 250 cases an hour.

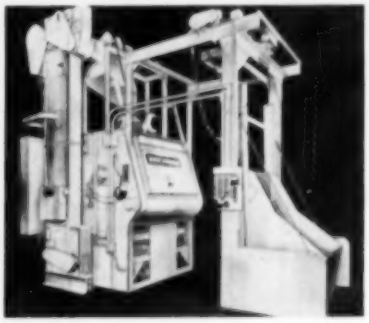
The operating cycle is controlled by pushbuttons. Loading and unloading is done by hand.

A hand cycle provides additional retraction of the spindles to make it easier to set or remove cutting tools. *Write*: Olofsson Corp., 2738 Lyons Ave., Lansing, Mich. *Phone*: Ivanhoe 4-5381

Blast Cleaning

The airless abrasive blast of the Tumblast cleans sand, scale, oxides and other contaminants from metal pieces that can withstand tumbling action. Capacity of the machine is 14 cu ft.

It throws 830 lb of abrasive a minute.



A separator makes certain every pellet thrown is effective metal shot or grit and that the optimum abrasive mixture is maintained throughout the blast cycle.

The machine is readily adapted to automation. *Write*: Wheelabrator Corp., Mishawaka, Ind. *Phone*: Blackburn 5-2141

Facing Machine

An even cut across the face of a rear axle housing is made by this machine. At 100 per cent efficiency, 34.2 housings are machined in an hour.

When loading, a hydraulic clamping fixture grips the ends of

CRANEMASTERS

. . . fill the bill for

CONTINENTAL CAN CO.

This 10-ton cab-operated *Cranemaster* is the first of two in service for Continental Can Co. Like so many other manufacturers, Continental Can Co. found Cranemasters *the top initial value . . .* with lasting satisfaction assured by Abell-Howe's years of experience in building overhead handling equipment that better *fills the bill* for industry of all kinds.

CAPACITIES TO 15 TONS —SPANS TO 60 FT.

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FOR BETTER CONTROL OF COSTS!

First, you save on Abell-Howe low engineering and production costs! Then you save on operating costs because of *Cranemaster* speed and dependability... and the precise control you need for the most demanding lifting-loading jobs.

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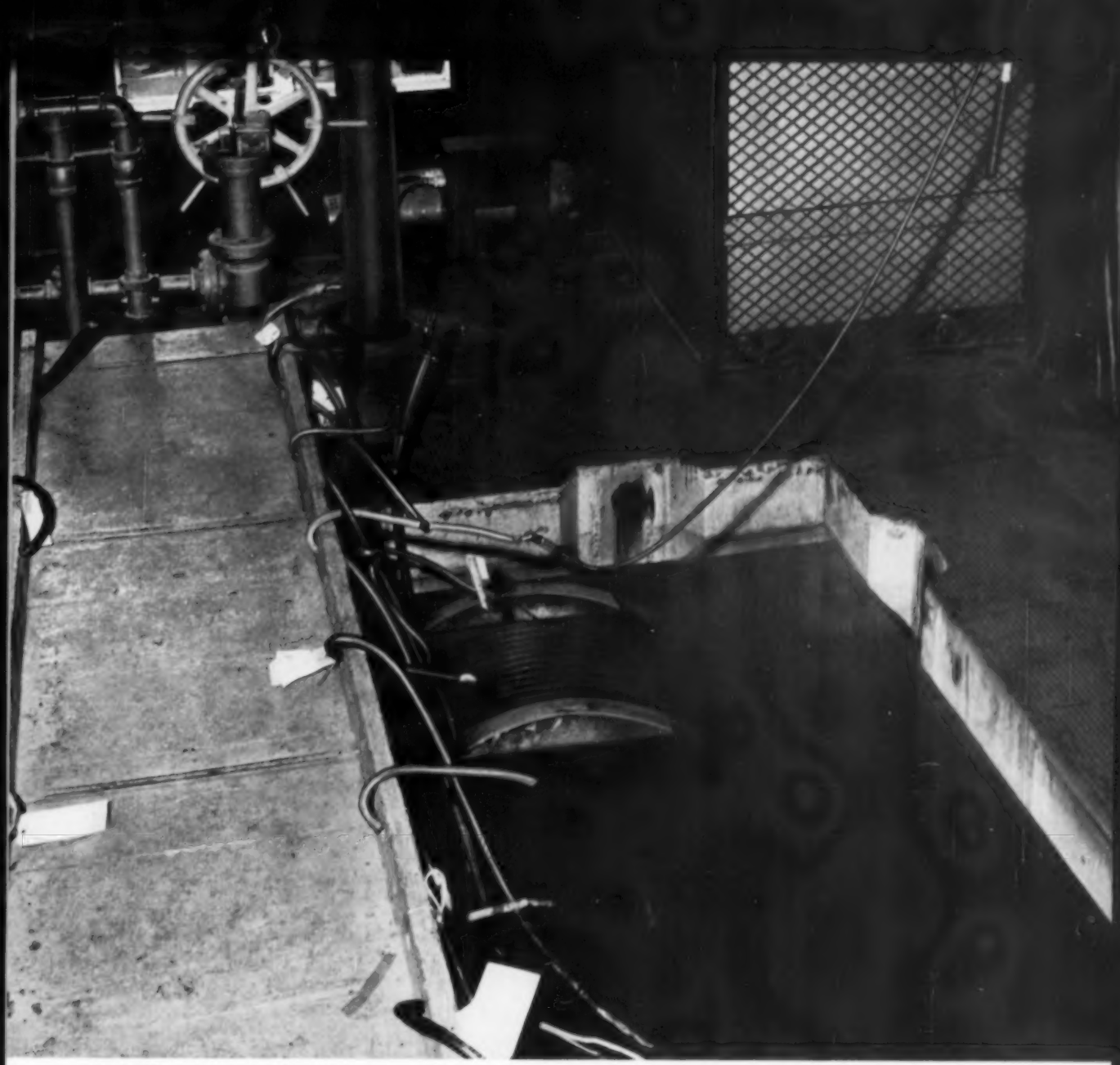
7747 Van Buren Street **ABELL-HOWE COMPANY** Forest Park, Illinois



Anaconda 15-kv cable is subjected to 106 kv — 33% above *industry standards with d-c.* And tested at 25% above *industry requirements with a-c.*

15-KV CABLE GOES

Skin diving at 106 kv

Anaconda Type AB butyl-insulated high-voltage cable is tested under water at 600% overvoltage to assure you peak performance.

The fact that two high-voltage cables may look alike does not mean they'll perform alike. At Anaconda, 15-kv cable is tested at 106 kv with d-c for fifteen minutes. This voltage is 33% *above industry standards with d-c.* And in addition, Type AB is tested at 25% *above industry requirements with a-c.*

Only a vastly superior insulation can stand such high test voltage, even though there is no defect in the cable.

For your assurance of maximum service, Anaconda butyl-insulated cables are designed to perform far beyond industry requirements – in every important electrical and physical property.

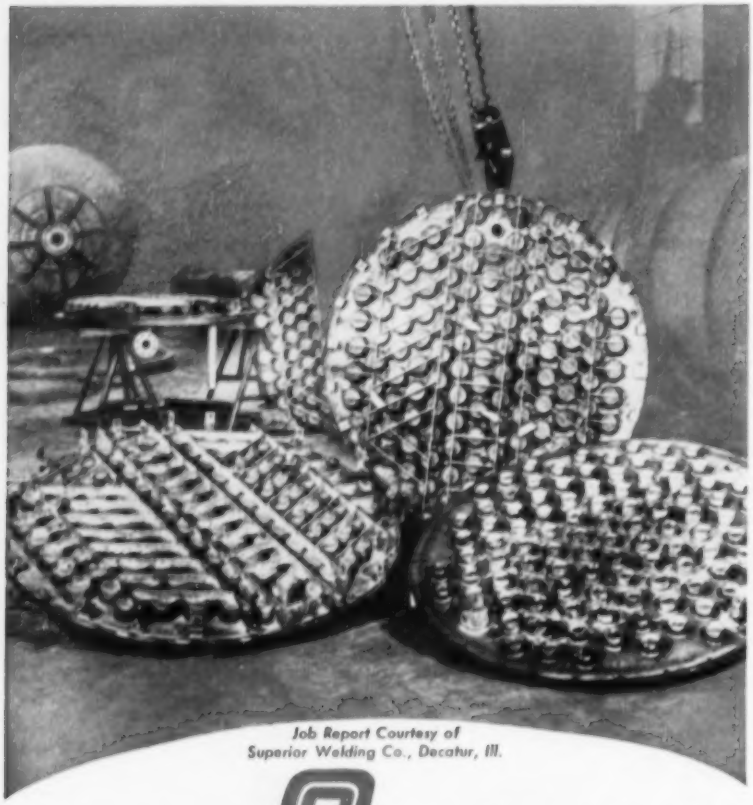
New Engineering Bulletin EB-27 gives you full details on performance of Type AB insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 58294

Get all the facts on Anaconda Butyl. Write today –

SEE THE MAN FROM **ANACONDA**®

pioneer in **BUTYL INSULATION**

When the *quality* of welded equipment is essential to performance



Job Report Courtesy of
Superior Welding Co., Decatur, Ill.

WELD WITH ARCOS

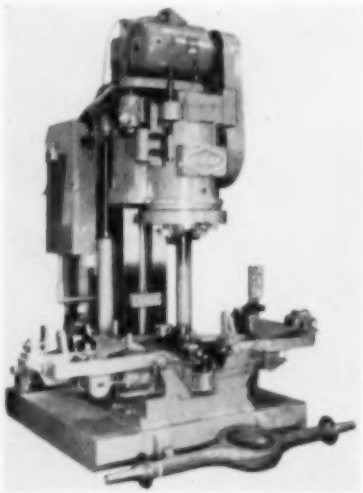
STAINLESS ELECTRODES

Welded bubble cap trays, such as these, are used to refine petroleum, petro-chemicals, and food products. They—and the welds—are subjected to corrosion from the liquids and gases passing over them. High processing temperatures intensify the corrosive conditions. ARCOS Chromend KMo Electrodes (Type 316 with 2.5% molybdenum) were used because of their ability to resist acid conditions combined with heat. These electrodes—like all Arcos stainless filler metals—produce welds that are trouble-free both during welding and in service.

ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

NEW PRODUCTS and equipment

the housing. A gage on the fixture swings out over the housing to locate its center, then swings out of the way before machining starts.

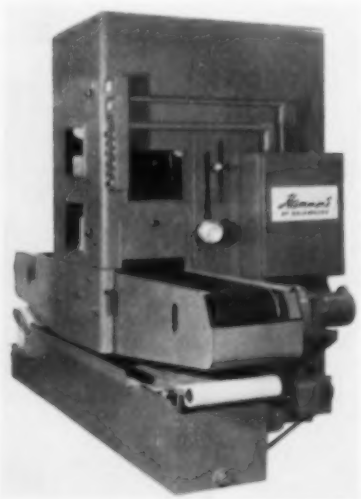


The fixture handles four sizes of housings. Simply by changing heads, you can adapt the machine to other uses, such as boring, drilling and tapping. *Write*: Baker Bros. Inc., Toledo 10, O. *Phone*: Cherry 4-9511

Flat Finisher

The FF-12 is for wet abrasive belt grinding, polishing and deburring of sheets, strip, bars, stampings and plates up to 12 in. wide and 6 in. high.

A variable speed endless con-

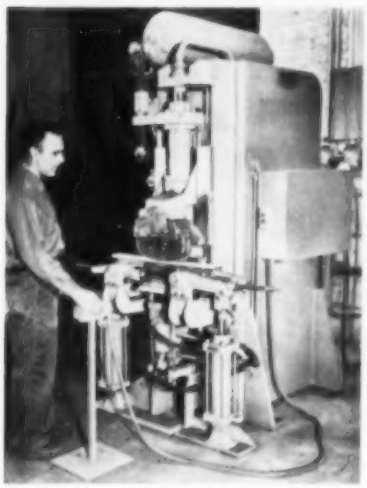


NEW PRODUCTS and equipment

veyor feeds work continuously. The two-roll design of the head uses an abrasive belt 12 in. wide and 126 in. long. *Write*: Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich. *Phone*: 5-7151

Tube Bender

You can put two bends in two or more tubes or two different angles in the same U-frame with this hydraulic press.



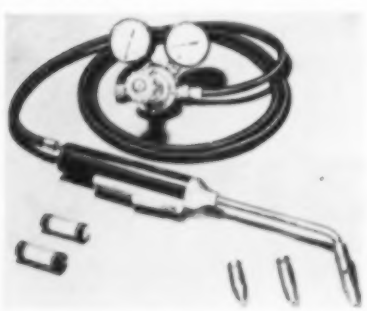
It'll handle steel or nonferrous tubing up to 1 in. OD. Rated capacity is 6 tons.

Model 6-T will produce 1700 to 3000 bends an hour. *Write*: Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill. *Phone*: Aurora 6-7701

Welding Torch

You can light this acetylene torch automatically by pressing the control lever. The torch shuts off instantly when not in use.

Pressing the lever opens the



When heavy chrome-moly welds must pass X-Ray Inspection

Job Report Courtesy of American Pipe and Steel Corp., Alhambra, Calif.

WELD WITH ARCOS

CHROME-MOLY ELECTRODES

In setting up this job—fabricating heavy alloy components of lead melting pots—new welding procedures were required to assure that all welds would pass x-ray inspection. With the help of Arcos Technical Service, both manual and submerged arc procedures were established and ARCOS Electrodes and Rods were used exclusively. The quality of Arcos weld metal consistently assures internally sound, flaw-free welds. And Arcos Technical Assistance prevented problems on what could have been a "tricky" job. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

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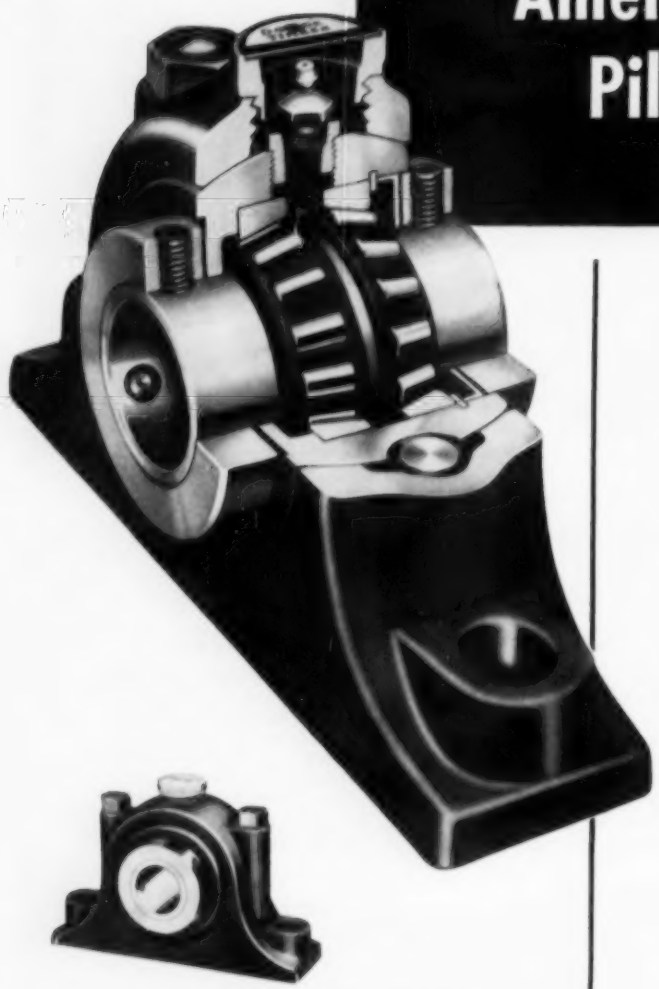
FOR ALL KINDS OF SERVICE

DODGE-TIMKEN
America's Quality Pillow Block



- COMPLETELY ASSEMBLED
- FACTORY ADJUSTED
- PRE-LUBRICATED

Call the Transmissioneer, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE-TIMKEN Bearings are adjusted, lubricated and sealed at the factory. Labrynth seals effectively retain the lubricant and prevent the entrance of dust and dirt. The inbuilt precision of Dodge-Timken Bearings is protected both on and off the shaft. They are delivered fully assembled, ready to mount.

Where service conditions are toughest Dodge-Timken Bearings prove their quality decisively. For superior performance, dependability and long life they have won their reputation throughout industry as America's quality pillow blocks.

To meet varying service requirements Dodge-Timken Pillow Blocks are available in five types—the type E . . Double Interlock (illustrated) . . Type C . . Special Duty . . . and All-Steel. Available in a range of shaft sizes from 1-3/16" to 10".

Call your Transmissioneer; or write for Bulletin A638 giving load ratings, dimensions and other data on Dodge-Timken Roller Bearings.

DODGE MANUFACTURING CORPORATION
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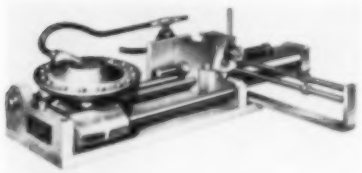
NEW PRODUCTS and equipment

torch gas valve and creates an electrical spark (from two small batteries) which ignites the gas.

There is no lock-on position for the control lever. This insures automatic shut-off when the torch is not in use. *Write*: Velocity Power Tool Co., 201 N. Braddock Ave., Pittsburgh 8, Pa. *Phone*: Churchill 2-5200

Press Feeder

The Ses-Matic Air Feed mounts directly to the bolster plate of a punch press. A valve of the feed is mounted so that it is tripped by some moving part of the press ram or die.



Maximum for stock widths and feed stroke lengths is 18 in.

The feeder can be moved from press to press quickly and easily. *Write*: Special Engineering Service Inc., 8161 Livernois Ave., Detroit 4, Mich. *Phone*: Texas 4-8700

Emergency Lighting

During power failures, this unit operates automatically.

It also automatically prepares itself for the next blackout—the lead-acid battery is charged at a high rate immediately following emergency discharge.

It can furnish current to one 25-watt sealed beam lamp for 8 hours. *Write*: Department AL, Exide Industrial Division, Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa. *Phone*: Locust 4-4030

Rotary Compressor

The Hydrovane is a 5-hp, tank-mounted unit for general industrial use. Maximum working pressure is 200 psi for continuous operation. In intermittent use, the compressor may be operated at 250 psi. Displacement is 21 cfm.

Units are available with either horizontal or vertical air tanks. *Write*: Davey Compressor Co., Kent, O. *Phone*: Orchard 3-3471

Induction Heating

This line of high frequency, vertical motor generators is for induction melting, brazing, annealing, hardening and forging. Generator ratings of 10 to 250 kw are available in frequencies of 100, 3000 and 10,000 cycles a second.

The motor generators are totally enclosed and are cooled by fin-type copper tube heat exchangers. Rotors are mounted on a common

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AIR-GRIP CLUTCHES

CHAIN COUPLINGS

SEALED-LIFE V-BELTS

DODGE BULLETINS YOU SHOULD HAVE

- Air-Grip Clutches. Technical data, sizes and selection tables. Bulletin A634
- Chain Couplings, Taper-Lock Sprockets and Dodge Roller Chains. Technical data and selection methods. Bulletin A644
- Sealed-Life V-Belts. Construction details and complete data on sizes, pitch lengths and outside lengths. Bulletin A606

Write for your copies.

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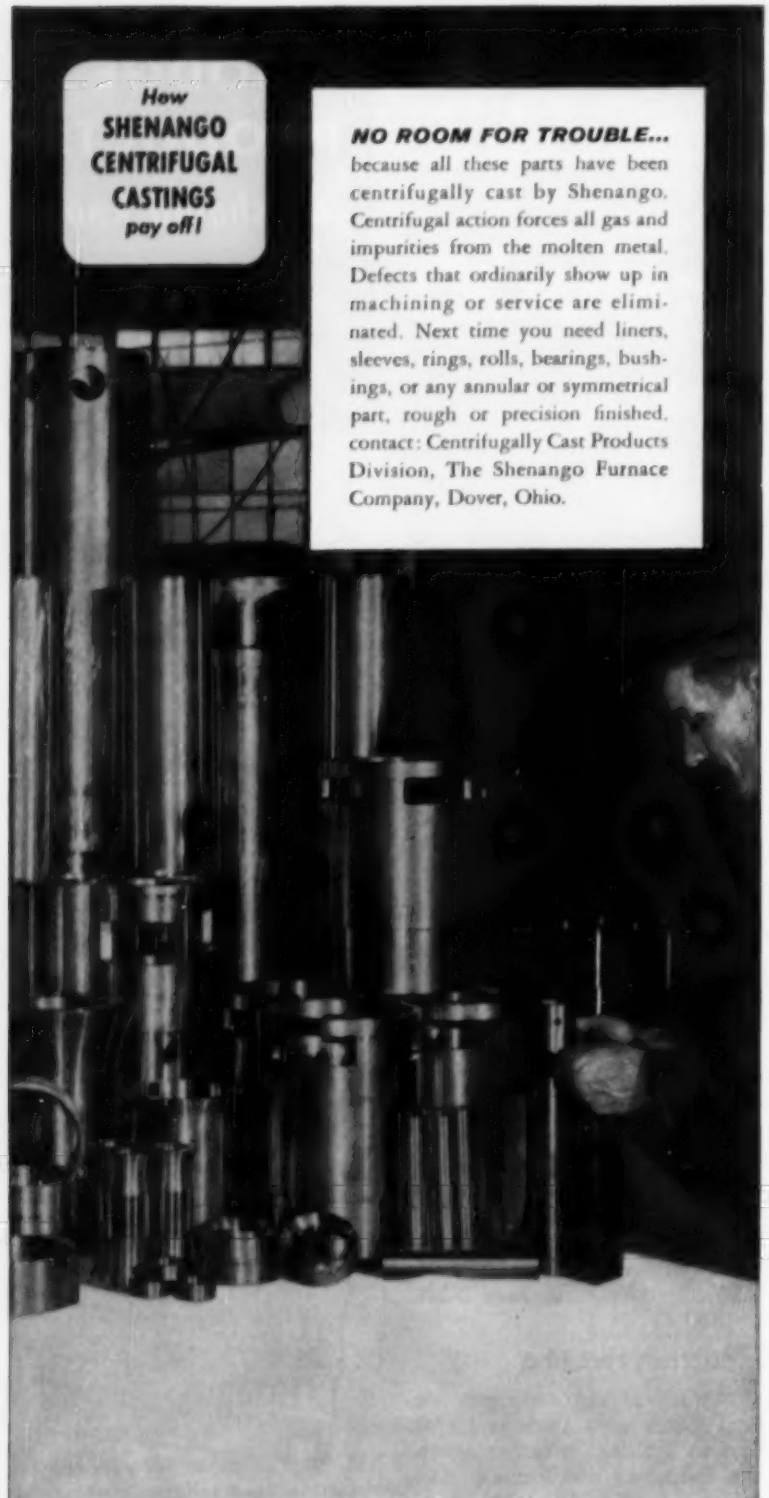
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shaft. *Write*: Welduction Corp., 10230 Capital Ave., Oak Park 37, Mich. *Phone*: Jordan 4-6768

Air Valve

This 1½-in. four-way valve is for service up to 250 psi. Its sealing principle consists of a pressure-balanced, self-aligning tubular sealing ring in constant contact with an optically flat porting disc or rotor containing the flow passage.

Noncorrosive materials are used for all valve parts. The seals, shaft and dent ball are stainless steel. The valve body and housing are aluminum.

Both full flow and throttling are possible. *Write*: Barksdale Valves, 5125 Alcoa Ave., Los Angeles 58, Calif. *Phone*: Ludlow 7-6181

Honeycomb Adhesive

EC-1469 is an epoxy resin with self-filling properties. It makes solid bonds between the honeycomb core and plate.

The adhesive can be used at service temperatures of −60 to +300°F.

Since no volatile by-products are given off during the cure, unperforated honeycomb cores can be used. The material meets govern-

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...."mirror-finished" by Standard

Standard "mirror-finished" cylinder tubing is full-finished to use without further sizing or finishing for such applications as *automobile shock absorbers, power steering* and *hydraulic pumps.* When it comes to punishment, it can really take it. Every inch of this rugged tubing measures up to exacting specifications in cylinder finish . . . in ID tolerances as close as .001" . . . in extreme uniformity of wall thickness and concentricity . . . in internal pressure resistance, *tested to shocks up to 9000 p.s.i.* Cylinder sizes to 3" OD x .165" wall. For full information on Standard's complete range of products, plant facilities and engineering assistance send for *free* folder below.

- **Welded Stainless Tubing and Pipe.**
- **Welded Carbon Steel mechanical.**
- **Boiler and Heat Exchanger.**
- **Exclusive rigidized pattern.**
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Shock absorber with metal-to-metal plunger in cylinder tube held to .001" ID tolerance. "Mirror-finish", concentricity and precision tolerance makes Standard cylinder-grade tubing usable *as is* for hydraulic and other cylinders.

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Ask Standard

how to cut costs with conveyors

Standard gravity roller conveyors like this are modest in cost, easy to install and maintain.

Conveyor system helps Airtemp up compressor parts production 40%

To handle stepped-up demands for residential and industrial air conditioners, the Airtemp Division of the Chrysler Corporation undertook an extensive re-tooling program. On one compressor crankcase line, for example, they installed 17 new machine tools . . . connected them all with Standard gravity roller conveyors. Result — two hours saving per case, production up 40%.

If you're planning on modernizing or retooling it will pay you, too, to find out how Standard conveyors can complement new equipment . . . give you lower overall costs and greater productive efficiency. STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal cities.

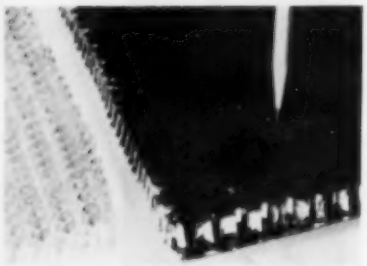
To expedite shipping or stocking and reduce handling costs, investigate Standard lightweight portable roller conveyors (right) or the portable, self-powered HANDIBELT conveyor (left), which can be used horizontally or at varying incline or decline angles.

For details — contact the Standard representative listed in the classified phone book or write direct. Ask for Bulletin V-11.

Standard 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

NEW PRODUCTS and equipment



ment specification MIL-A-5090B. *Write*: Adhesives & Coatings Division, Minnesota Mining & Mfg. Co., 423 Piquette Ave., Detroit 2, Mich. *Phone*: Trinity 5-7111

Coolant Clarifier

Model 115 removes free abrasive grains and metal particles from grinding and honing coolants with centrifugal force.

All types of coolants are handled; dirt-holding capacity is over 3 gal.

Installation space is 6 sq ft. *Write*: De Laval Separator Co., Poughkeepsie, N. Y. *Phone*: 4200

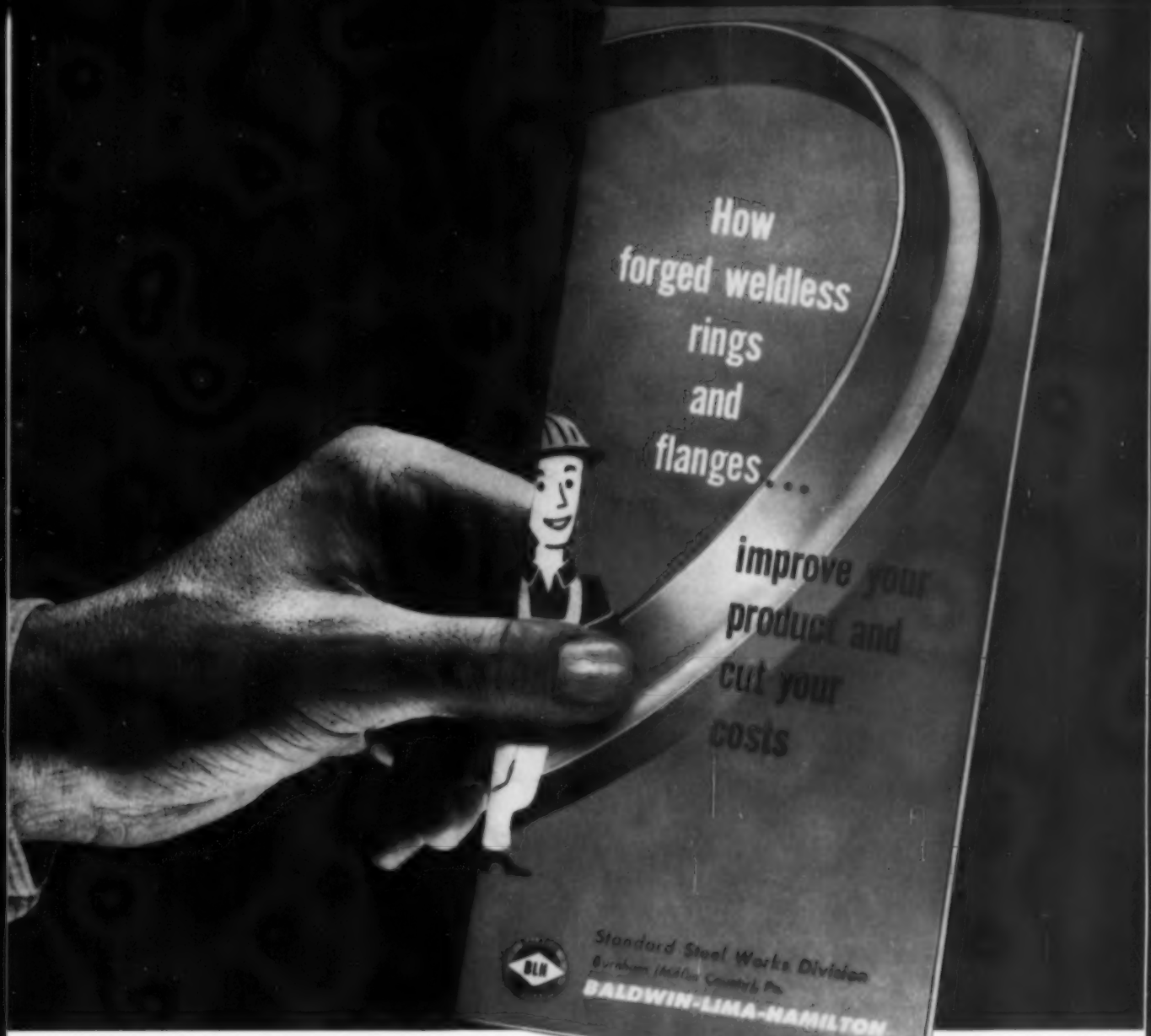
Atomic Hydrogen Welder

An automatic hot start device on this welder gives a current surge for positive starting, particularly at low current settings.

Power factor capacitors are used to reduce line current needs and power costs.

Gas flow is controlled automatically; it flows when the arc is struck between the two electrodes.

Current range: 7 to 100 amperes. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211


How forged weldless rings and flanges...
improve your product and cut your costs
Standard Steel Works Division
BALDWIN-LIMA-HAMILTON

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When you consider a change in your product, you expect that change to make money for you or to save money for you.

It's quite possible that Standard Steel forged weldless rings and flanges will do *both*.

They improve your product, thus making your sales task a little easier, and they cut your manufacturing costs. In many cases, first cost may be less than the component you now use, and invariably machining time is less.

From this little booklet, you can see in five minutes how Standard Steel forged rings and flanges will fit into *your* picture. Send the coupon now.

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Baldwin-Lima-Hamilton Corporation, Burnham, Penna.

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B-2391

NEW literature

Write directly to the company for a copy

Cupola Operation

Bulletin FO-11, 8 pages, discusses factors that affect combustion and melting conditions in cupolas. Whiting Corp., Harvey, Ill.

Rotary Knives

Slitting knives, trimming knives, spacers, scrap chopper tools and metal lath tools are presented in bulletin 561, 4 pages. Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.

Air Valves

Design and use of air valves are described in a 30-page booklet. Mechanical Air Controls Inc., 10030 Capital, Oak Park, Detroit 37, Mich.

Electrical Catalog

More than 400 electrical and mechanical products are listed in catalog 12. Holub Industries Inc., Sycamore, Ill.

Weld Fasteners

Bulletin 563, 8 pages, lists weld fasteners and adjusting screws. Ohio Nut & Bolt Co., 33 First Ave., Berea, O.

Socket Screws

This 16-page bulletin gives specifications of self-locking socket screws. Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

Metals Catalog

Solid and clad precious and base metals, industrial metals, electrical contacts, contact parts and assemblies, thermostat metal and thin gage metals are detailed in a general catalog. General Plate Division, Metals & Controls Corp., Attleboro, Mass.

Research

Bulletin 48B8448, 24 pages, depicts research facilities for projects involving electricity, mechanics, chemistry, metallurgy and nucleonics. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Industrial X-Ray

This 12-page bulletin gives operating and application data on six types of radiography units. Instruments Division, North American Philips Co. Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.

Greases

Bulletin 49, 2 pages, describes water-resistant greases for shock-loaded bearings. Bulletin 50, 2 pages, describes premium greases with strong resistance to water and high melting points. Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

Fasteners

Corrosion-resistant fasteners made of stainless steel and nonferrous alloys are described in bulletin 613, 24 pages. H. M. Harper Co., Morton Grove, Ill.

Industrial Trucks

Bulletin 29-1, 20 pages, describes a line of two and four-wheel trucks and a line of storage racks. Department R-33, Lewis-Shepard Products Inc., Watertown, Mass.

Blast Cleaning

Eight case histories show how foundry cleaning rooms are automated with airless abrasive blast cleaning. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

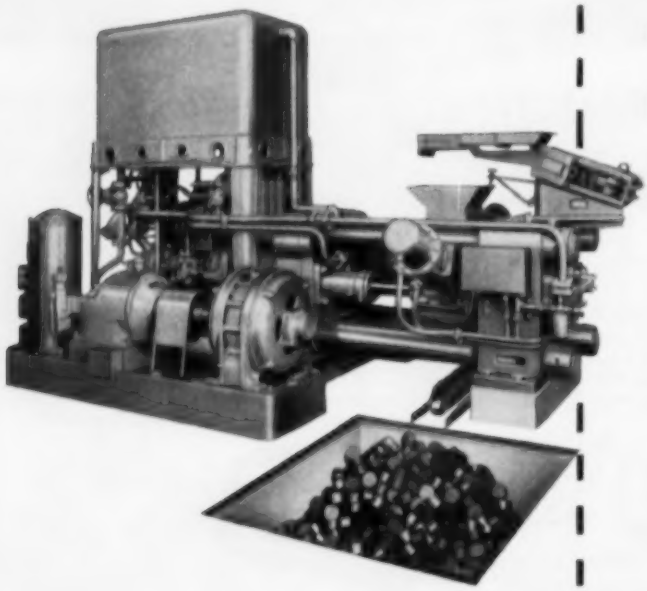
Disaster Recovery

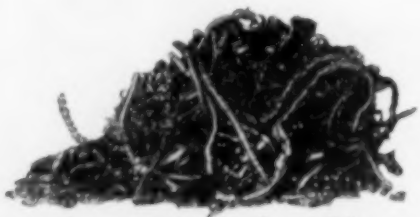
Procedures that aid in the quick repair of electrical equipment damaged by floods and other natural forces are explained in a 12-page bulletin, GEA-6484. General Electric Co., Schenectady 5, N. Y.

Suspended Magnets

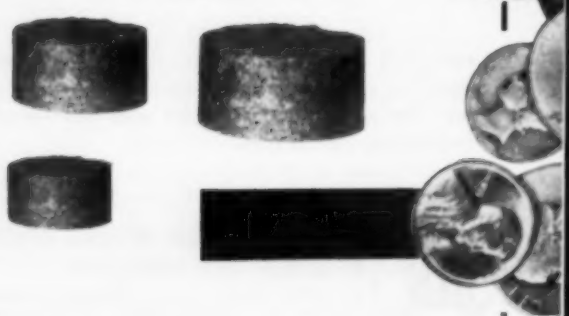
Magnets that separate tramp iron from material in conveyor systems are described in bulletin 1031. Stearns

this
"metal-working mint"





converts bulk
machine tool scrap
into briquettes



Magnetic Products Division, Indiana Steel Products Co., 635 S. 28th St., Milwaukee 46, Wis.

Cold Header

A solid die, double stroke machine that heads 300 to 450 rivet or screw blanks a minute is described in a 2-page bulletin. Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Heat Treating Furnaces

Bulletin SC-175, 8 pages, depicts equipment for all types of industrial heating—from small laboratory furnaces to large continuous brazing furnaces. Surface Combustion Corp., Toledo 1, O.

Vacuum Pumps

A complete line of rotary mechanical pumps and data tables used in vacuum processing are presented in bulletin 752, 28 pages. F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Gray Iron

This 106-page booklet gives technical data on the manufacture and use of gray iron and alloy iron castings. Emmaus Foundry & Machine Co. Inc., Emmaus, Pa.

Castable Refractories

Mixtures of alumino-silicate base materials that can be poured, troweled or gunned into place are described in an 8-page bulletin. Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.

Ball Bearings

This 64-page catalog gives performance data and dimensions of bearings. Barden Corp., Danbury, Conn.

Plating Solutions

Here's a 36-page bulletin that details 28 analytic methods for testing nickel, copper, silver and other plating solutions. Hanson-Van Winkle-Munning Co., Church St., Matawan, N. J.

Precision Lapping

The uses of precision graded diamond abrasives and their accessories are described in a 28-page bulletin. Penn Scientific Products Co., 1000 Old York Rd., Abington, Pa.

Extrusions

This 12-page bulletin discusses the advantages of aluminum in structural applications and outlines design concepts for aluminum extrusions. Harvey Aluminum Structures, 19200 S. Western Ave., Torrance, Calif.

Optical Tooling

This 20-page bulletin describes the theory, principles and practice of optical tooling used for measuring, positioning and aligning. Charles Bruning Co. Inc., 4700 Montrose Ave., Chicago 41, Ill.

Instruments

Primary elements for detecting changes in temperature, pH, gas concentrations and other operating variables are depicted in a 12-page bulletin. Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia 44, Pa.

Press Modernization

Bulletin ML-172, 15 pages, lists packaged clutches, brakes, clutch controls and flywheels for press modernization. Fawick Airflex Division, Fawick Corp., 9919 Clinton Rd., Cleveland 11, O.

Work Holding Fixtures

Machine tool vises, angle vises, adjustable angle plates and lathe fixtures are presented in bulletin 9156, 16 pages. Universal Vise & Tool Co., Parma, Mich.

and extra profits ...automatically!

MILWAUKEE BRIQUETTING PRESSES INCREASE SCRAP VALUE $20.00 PER TON . . . OR MORE . . . by converting bulk borings, turnings and chips into briquettes. Classifying as high-grade scrap, briquettes are small, dense and uniform in size . . . eliminate scrap handling problems . . . require minimum storage space per ton . . . assure a more profitable operation for high-production metal-working plants of all types.

Six models of these automatic hydraulically-operated presses are available. Capacities range from ¾ to 3½ tons per hour.

FOR DETAILS AND PRICES, WRITE FOR BULLETIN 117.

SPO — WORLD'S LARGEST SUPPLIER OF MOLDING MACHINES

MILWAUKEE Foundry Equipment Division

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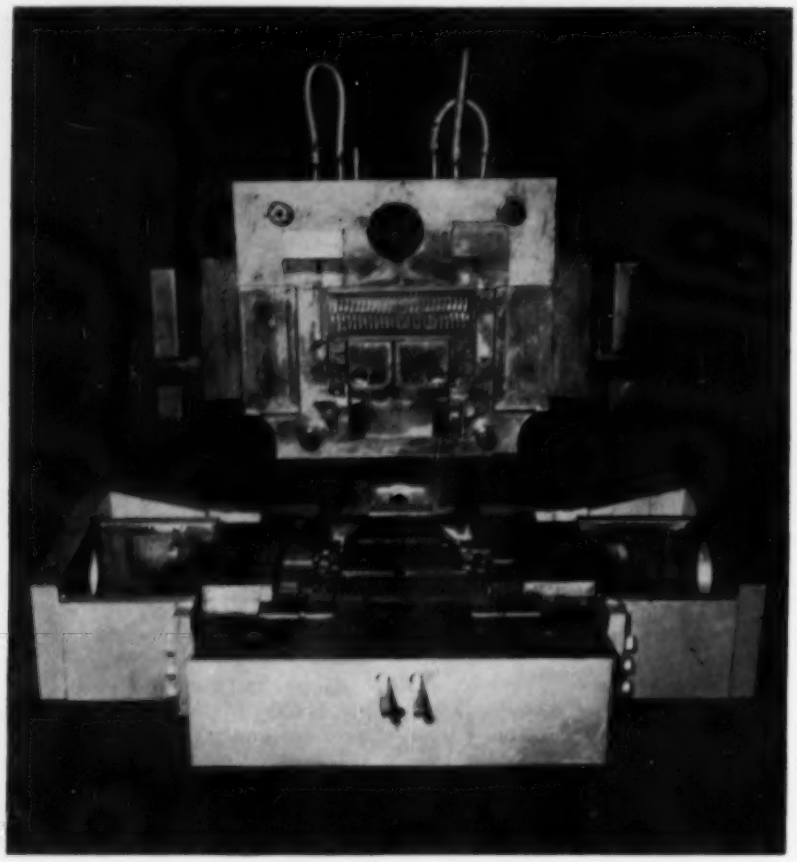
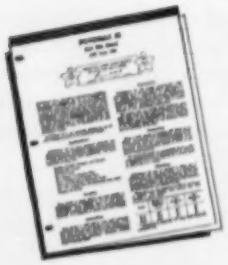


No matter what your DIE-CASTING JOB may be...

Accuracy calls for POTOMAC M Hot Work Die Steel



Write for BLUE SHEET on POTOMAC M

This concise four-page folder gives all needed handling and shop treatment details on Potomac M. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. *Ask for your copy.*

ADDRESS DEPT. S-831

In the precision casting of aluminum, POTOMAC M Hot-Work Die Steel is especially favored as the material for die-casting dies because its properties help assure accuracy of the steel itself *after* heat treatment. Die makers have found that size changes are held to a minimum. Dimensional stability is thus the *first* contribution that POTOMAC M makes to accuracy.

Production accuracy of the die after it is in service is maintained also by the resistance of POTOMAC M to wear, to heat checking, and to metal wash.

Allegheny Ludlum makes a complete line of steels for hot-work tooling of various kinds—so, whether your need is the mass producing of duplicate parts or fabricating a few of them, call up or write "A-L" every time for hot-work counsel or service or both. Just tell us your requirements.

● *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call

Allegheny Ludlum

WSW 4295

AL® FINE TOOL STEELS SINCE 1854

STEEL
November 26, 1956

Market Outlook

A DARK road's ahead for users of steel plates.

Reason: A threatened intensification of demand for this product.

For months, demand has exceeded supply. Now plate producers fear they'll have also to take on the responsibility of supplying material for a government shipbuilding program involving a fleet of tankers (see page 64).

TROUBLES— There are handicaps to plate production. One producer lost 5000 tons of plate production in October because of freight car shortages. The company had to close one mill for several days. It lamented: "We couldn't ship plate to the freight car builders because we couldn't get the freight cars to haul it. We couldn't get the cars because of the plate shortage!"

TIME OUT—Bethlehem Steel Co.'s mill at Sparrows Point, Md., probably will be out of plate production in February and March for a change in facilities. It is expected that the company will be back into production in April, making wider plate. The wide sizes are much in demand. While Bethlehem's increased capacity will be a help, the temporary absence of some of its production will be felt.

ON GUARD— Plate producers could fill their books for a whole year, but they can't allow themselves to become committed that far when they know they may have to take care of the tanker program needs.

Indicative of mill efforts to supply plates is the performance at the Indiana Harbor, Ind., plant of Inland Steel Co. In October, it broke its 14-year-old record for shipments of plates.

AN EFFECT—Because of the difficulty in procuring plates, efforts are being made at substitutions. In the Seattle area, several projects involving plates have been bid on alternative materials because of the shortage. One of them involves 2000 ft of 42-in. replacement for Seattle's Cedar river pipe line. Concrete cylinders may be used instead of pipe fabricated from steel plates. Plate fabricators in the Seattle area find it difficult to compete, particularly where time is important, because of the uncertainty of mill deliveries. Small shops find it necessary to limit bids to materials in inventory. So only minor jobs are figured.

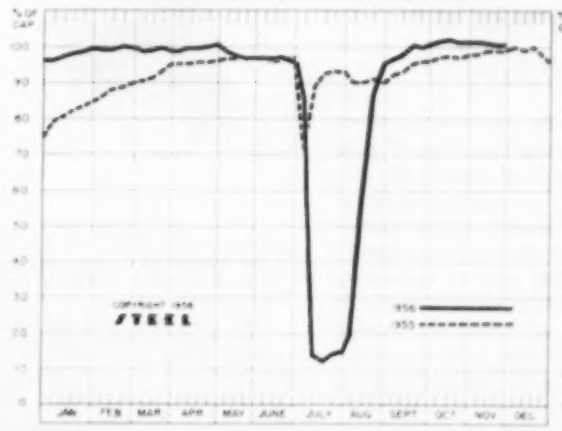
Heavy demand for structural shapes, too, spells shortages in many fabricating shops. In many instances, their operations are limited to the material available.

INFLUENCES— Other steel products give promise of being in good demand—perhaps stepping up somewhat. One incentive to buy is the possibility of price increases before long. One deterrent to buying will soon be out of the way—the year-end property-inventory taxes in some states that influence people to get their stocks down low by the close of the year.

Despite any inclination to reduce inventories, orders on the books are sufficient to keep mills producing ingot steel at 100.5 per cent of rated capacity.

ANOTHER RECORD— Scrap prices continue to reflect optimism over steel production. For the second consecutive week, STEEL's price composite on steelmaking scrap set a record. It registers $62.00 a gross ton, a 50-cent increase over that of the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 25	Change	Same Week 1955	Same Week 1954
Pittsburgh	97	0*	100.5	77.5
Chicago	100	0	98.5	90
Mid-Atlantic	102	0	98	72
Youngstown	104	0	100	58
Wheeling	102.5	+ 1	101	79.5
Cleveland	104	+ 1.5*	100	86
Buffalo	107.5	0	100	97.5
Birmingham	96.5	0	91	64
New England	85	— 2	90	58
Cincinnati	96	— 0.5	92.5	75.5
St. Louis	100	— 6	109.5	82
Detroit	101	+ 1	95	80
Western	107	— 2	99	83
National Rate	100.5	0	99	79.5

INGOT PRODUCTION‡

	Week Ended Nov. 25	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	153.0†	153.5	156.1	150.4
NET TONS (In thousands)	2,458†	2,466	2,491	2,416

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

This Whiting Crane at Continental quickly carries heavy coils of wire from storage to production—keeping machines busy without jam-up.

How Continental Steel's "special" cranes pay off!

Continental Steel Corporation, Kokomo, Indiana, depends on three "special" Whiting Cranes to keep production flowing fast. Two of them are 5-ton overhead cranes used to spot coils of wire accurately at automatic wire welding machines, then move the finished reinforcing fabric to shipping or storage. The third Whiting Crane is a low profile gantry with floor level hoisting drive. It moves all production in Continental's pickling department and has played an important part in increasing the company's wire production by nearly 50%. These cranes — like all Whiting Cranes — are "special" because each is custom engineered to do a specific job, day in and day out, with a minimum of maintenance.

WHITING CORPORATION, 15643 Lathrop Avenue, Harvey, Illinois

SEND FOR THIS REPORT!

An illustrated 6-page case study, "Custom Built Whiting Cranes for Continental Steel Corporation" tells how these cranes were engineered to solve special problems. Write for a copy today.

MANUFACTURERS OF CRANES, TRAMBEAM HANDLING SYSTEMS, TRACKMOBILES, FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

More Scrap Moves Overseas

(Exports by countries, gross tons)

	1956 (8 months)	1955 (Entire Year)
Argentina	12,623	92,796
Austria	17,633	71,007
Belgium and Luxembourg	168,464	166,182
Canada	387,028	383,400
France	234,367	229,135
Italy	676,127	1,029,243
Japan	989,938	672,948
Mexico	219,046	247,283
Netherlands	24,158	37,937
United Kingdom	367,481	917,580
West Germany	180,047	599,523
Yugoslavia	22	15,322
All others	63,717	75,016
Total	3,340,651	4,537,372

Scrap Exports Near Record

Japan takes over No. 1 spot as last year's leading customers, Italy and United Kingdom, fade. No shortage is anticipated despite high level of domestic consumption

FOR the second year in a row, the export of ferrous scrap is heading for a record, but there is no danger of a pinch on domestic supplies. Despite the heavy overseas shipments during the first eight months of this year (see table above), steel production—running at better than capacity—has not been handicapped by a lack of scrap.

Exports for the first three quarters of this year totaled about 3,667,400 gross tons, compared with 3,294,038 tons for the corresponding period last year. Foreign demand is leveling off during the fourth quarter, so the annual figure may fall short of the 5 million ton mark—it will be close to 4,889,000 tons. But that will still top the peak of 4,537,372 gross tons shipped last year. The previous record was posted in 1937 when Japan was among the leading consumers of American scrap iron. That country resumes its historic role this year.

Looking Ahead — Next year's outlook depends largely on the government's policy concerning the licensing of shipments to friendly nations. One of the big problems to be resolved is whether this country can continue to export and consume ferrous scrap at present rates and still have enough left to support possible wartime needs. The Bureau of the Census and Battelle Memorial Institute are working on the problem and may throw light on the matter as early as February.

Trade opinion on scrap exports has long been divided, largely along domestic consumer and seller lines. Aside from the export problem, price is the big issue. Scrap prices are at an all-time high. (STEEL's steelmaking scrap composite hit $62.00 a ton during the week ended Nov. 21.) Scrap men agree that prices would be lower if there were no exports, but by how much no one agrees.

Added Costs—At least one steel executive has spoken out strongly against any increase in scrap exports. Ralph L. Gray, president of Armco Steel Corp., Middletown, O., says there is no evidence that the scrap supply is sufficient to meet domestic needs, much less heavy exports. Connecting exports with rising prices, he claims scrap prices have climbed more than 75 per cent in the last two years, adding nearly $900 million annually to the nation's steelmaking costs. He anticipates an even greater foreign demand next year.

But Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel, says: "More than ever before it seems desirable for this country to support friendly foreign nations in both Europe and Asia with raw materials as well as dollars. Exports continue heavy, and stocks of both consumers and dealers at home are only moderate, but there should be sufficient scrap to meet all requirements." Many traders contend that our exports represent excess scrap. They say many of the shipments have been from points well removed from areas of heavy domestic consumption.

Friendly Japan — The largest customer by far this year will be Japan, as the figures above indicate. By the end of the third quarter, her imports from the U.S. ran about 1.1 million gross tons. This has caused some raising of eyebrows in the trade. Advocates of free export trade point out that it's the government's policy to strengthen Japan's economy. They also point out that Japan is the second largest shipbuilder in the world, and no small amount of our scrap is going into ships being built for the U.S. While a large amount of Japan's scrap purchases are uncleaned motor blocks, there are some founders who complain this is eating into tonnage that

would otherwise be cleaned and processed for their accounts.

Peak overseas demand for U.S. scrap is past for 1956. Shipments will level off or decline the rest of the year. Italy, last year's leading customer, is tapering off, and the United Kingdom, a large customer last year, is showing even less interest during the fourth quarter than she did during the first nine months. Shipments to England for the first three quarters are estimated at less than half of last year's total. Even Japan may be over the hump for 1956.

Around the Coast — Practically all major ocean ports have contributed to the faster tempo of scrap exports this year, with south Atlantic and gulf ports playing major roles. San Francisco and southern California cities have shown a large increase in business, almost solely because of Japan. Demand from that nation has been so great that the impact has been felt even in north Atlantic ports.

Exportation by grades is following much the same pattern it did last year, with No. 1 and No. 2 heavy melting steel taking the biggest tonnage. Baled sheet melting scrap and iron scrap are second and third.

Imports of scrap continue relatively unimportant—only 102,615 gross tons entered this country during the first seven months of 1956. Practically all of it is coming from Canada and Newfoundland.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 152 & 153

Cold-rolled sheet supplies are a little tighter, but with specifications from the automotive and appliance industries still lagging, most producers have tonnage to offer for February shipment and beyond. They think that before lead time expires for February they will be in a highly comfortable position for that month, and that the trend will continue upward through March.

Sheet sellers are turning away inquiry for hot rolled. Demand for electrical sheets for heavy transformers and generators still exceeds supply. But inquiry for low silicon sheets, required for fractional horsepower motors, still lags, at least partially reflecting the spotty buying of household appliance manufacturers.

A Chicago district sheetmaker who expects to be fully booked during the first quarter, feels that prospect is more certain than ever. Customer response to January quotas shows that all tonnage for that month will be taken up. The auto industry is taking all its quotas but it is not asking for more. It is pointed out that this doesn't preclude a push for cold-rolled sheets in January and later months. Right now, car assemblies are far behind schedule. Steel isn't being consumed at the rate orginally projected.

In New England, first quarter orders for flat-rolled are largely for January. Releases beyond that month are slow, but include slightly heavier tonnage on automotive component account. Hot-rolled strip tonnage will be tight over the next three months, but supply will be ample in cold-rolled strip, galvanized and coated sheets, enameling stock, and most silicon grades.

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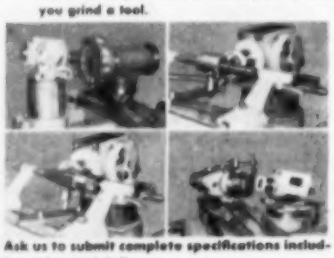

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Grain-oriented silicon sheets are in stronger demand. Straight chromium grades of stainless, 430, can be shipped promptly.

Superior Steel Corp., Carnegie, Pa., recently revised prices on copper clad strip. It now quotes: Cold-rolled clad, 10 per cent both sides, $40.65 per 100 lb; cold-rolled clad, 10 per cent 1 side, $33.40. These prices cover phosphorus deoxidized copper clad, red brass (85 copper, 15 zinc), and gilding metal, (90 copper, 10 zinc).

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 151

Demand for reinforcing steel bars continues strong. Orders for early spring delivery are bolstered by design changes to reinforced concrete, resulting from the scarcity of structural steel.

Bar mill output in most cases is heavy and shipments are building up distributors' stocks. Of heavy steel products required for construction, reinforcing bars are showing the best improvement toward equalizing with demand.

Reinforcing bar producing mills in the Pacific Northwest are operating close to capacity. Last week's awards in the area were confined to small tonnages but mill order backlogs are said to be larger than normal, extending well into first quarter next year.

Steel Bars . . .

Bar Prices, Page 151

Heavy requirements for reinforcing bars are limiting production of the large diameters, but output of all other sizes is sufficient to keep pace with demand.

Hot-rolled barmakers are of the view they will have no difficulty selling their entire first quarter output. Although present sales are below expectations, cold-finished bar suppliers predict improved demand in the first quarter, chiefly on automotive account. Current ordering by auto builders and partmakers continues on the conservative side.

Demand for hot bars is more active in the Philadelphia market. Jobbers there are experiencing a faster turnover and are bringing more pressure on the mills for tonnage. There also is livelier interest among direct mill consumers.

Cold-finished bar specifications also are picking up a little in the district. Processors can promise early shipments in most cases.

Chicago district sellers say that right now the prospect is that steel demand from the farm implement industry won't be much above 1956 requirements. Some observers think farm implement sales could improve 10 to 15 per cent next year, but more conservative estimates are that the pickup will be no more than 4 to 6 per cent.

Consumers in the East find it increasingly difficult to pick up hot carbon bars for shipment before Febuary. The lead time for January has expired and anything obtainable for shipment prior to February would depend largely on last minute cancellations or deferments at the mills, a rather lean prospect.

The cold-finished carbon bar situation is far different. Various stock sizes are available for delivery in December, and the cold finishers also have alloy bars for

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"PROMAT MEANS PROTECTIVE MATERIALS"

early shipment. In general, alloys are still in light demand.

In New England, large rounds and heavy flats in the carbon grades are the most difficult for scheduling in the first quarter. Hot-rolled buying is better sustained than might be expected in view of substantial inventories held by converters and warehouses. Automotive volume from the forge shops in the area is picking up.

The Northeastern Steel Co., Bridgeport, Conn., is getting into production with new cold-drawing facilities.

Semifinished Steel . . .

Semifinished Prices, Page 151

The Middletown Works of Armco Steel Corp. produced more steel ingots in October than in any month in its history. The plant's 13 open hearths and two electric furnaces produced 189,217 tons during the month. The best previous month was last April when 186,421 tons were poured.

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Plates . . .

Plate Prices, Page 151

From week to week, plate producers find it necessary to revise their calculations of probable unfilled order carry-overs. Mills hoped to become current with demand by Jan. 1, but increased government set-asides and proposed closing down of an eastern mill in Febuary and March have added to the already top-heavy burden on mills generally.

First quarter production is sold out at Pittsburgh, and producers in that area decline to accept second quarter business. They could sell all anticipated 1957 production had they a mind to do so. Freight car shortages have adversely affected district production. One area mill had to halt operation early this month because of the lack of cars to ship finished plate.

Although the Pittsburgh mills as a rule do not supply eastern seaboard users to any great extent, a tank construction program will force district mills to cut quotas for construction and miscellaneous consumption for most of 1957.

Strongest demand for steel continues in the heavy products, notably plates and shapes, and the international situation casts a shadow over supplies of both, but principally plates. Currently, it is figured in the Midwest that the military set-asides for plates average about 5 per cent. The tight situation will be intensified should the government launch a tanker program.

In October, Inland Steel Co. broke a mill shipping record for plates that had stood for 14 years. The mill also broke a six-month-old production record, and, in the process, improved on an average tons-per-turn mark that was set in September.

Better availability of carbon plates in all sizes is reported in New England. But most sellers are booked up through the first quarter on quality grades and hold four to six weeks carry-over on carbon grades. District tank shops have heavy backlogs for this season. They have low inventories of light gage plates and are not getting hoped-for tonnage from the sheet-strip mills.

Tank fabricators in the East

report an easing in municipal work, due in part to the tightening money situation. However, industrial requirements seem to be holding, and, in general, tank shops are busy, with delivery promises extended. Their main concern is obtaining sufficient plain material to keep going at normal capacity on a single shift.

Despite pressure for quick deliveries, plate shipments on the West Coast are averaging four to six weeks. Several projects in the Pacific Northwest have been bid on an alternative basis due to the scarcity of plates. They include a Bureau of Reclamation job at Bridgeport, Wash.

While anticipating at present no change in the volume of rated tonnage set up for the first quarter, Washington is understood to be asking plate producers to check on the amount and character of incoming specifications. Reason: so it may make adjustments if they become necessary. Carbon plate setasides for the period stand at around 10 per cent of capacity, compared with 8 per cent in the current quarter.

The Office of Defense Mobilization is reported to have requested defense officials to submit their anticipated requirements for 1957 before the end of December, instead of by Jan. 15, as originally requested.

Wire . . .

Wire Prices, Pages 153 & 154

More wire orders from the automotive industry for January shipment are being booked. Placement of this tonnage has been delayed by inventories and year-end property-inventory taxes in some states.

Demand for rope wire is up slightly. Several large government inquiries for rope are out.

Wire rod makers at Buffalo report that supplies of that item generally are short, though demand for wire products generally is spotty.

Wire product prices at the secondary level are reported mixed.

Most producers of wire specialties are shipping in volume about equal to incoming orders, and their backlogs are smaller. Overtime costs are generally eliminated.

More specialties are coming in from Japan, including clock wire; also umbrella stock, nontempered 0.80 carbon grade flat wire. Japan has been pushing this wire for some time at prices well under the domestic market.

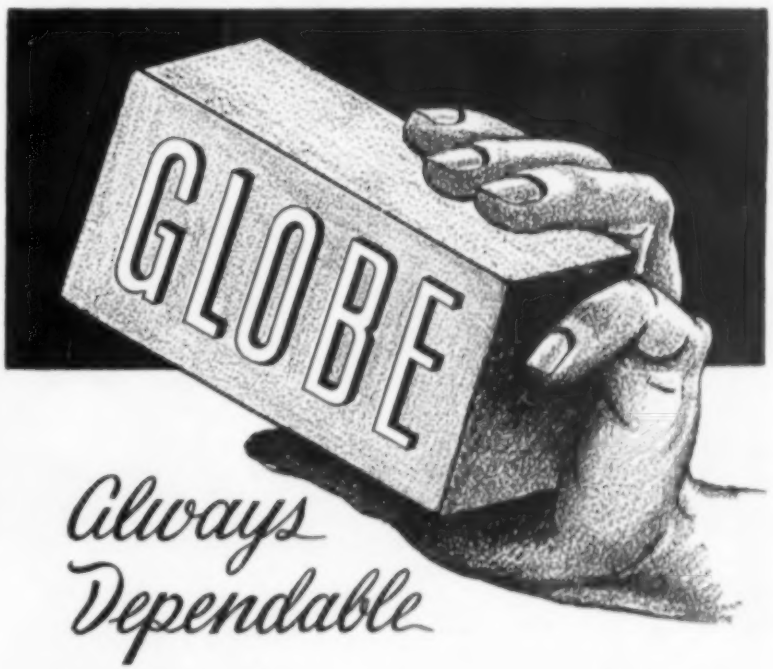
Tubular Goods . . .

Tubular Goods Prices, Page 155

The tubular goods market outlook is mixed. Oil country goods are under heavy demand pressure from consumers, many of whom plan increased drilling operations next year should an oil shortage develop as a result of the crisis in the Near East.

Even without a shortage, the outlook is for a critical need for high-alloy tubular products, and heavy demand for casing and drill pipe already is indicated. First quarter production is reported to be sold out

Mechanical and pressure tubing producers report sales have been slow this month, and they are ex-



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pected to be dull (for seasonal reasons) in December. Automakers' inventories are holding down mechanical tubing sales.

First quarter demand for standard pipe is better. Several producers have closed order books for January shipments two to three weeks earlier than usual because of strong demand. They say users' stocks should be whittled down by first quarter.

Effective Nov. 15, Youngstown Sheet & Tube Co. revised quantity extras on standard and line pipe. The extra for quantities of less than 1 ton for shipment in carload with other pipe is eliminated.

Orders placed prior to Nov. 15 which are shipped by Dec. 31 will be invoiced under the old method of pricing. Exception: New extras will be used if they result in a lower price.

Orders placed after Nov. 15 will reflect new extras. The revised list applies to all shipments made on and after Jan. 1, 1957.

New quantity extras are:

Quantity	Points lower discount
(⅛-in., ¼-in., ⅜-in. pipe)	
1 ton and over	No extra
Under 1 ton	6½-points
(½ to 1½-in. pipe)	
2½ tons and over	No extra
1 to under 2½-tons	2½-points
½ to under 1 ton	5 points
Under ½-ton	12 points
(pipe 2-in. and over)	
5 tons and over	No extra
2½ to under 5 tons	2½-points
1 to under 2½-tons	5 points
½ to under 1 ton	5 points
Under ½-ton	12 points

Warehouse . . .

Warehouse Prices, Page 156

The shortage of freight cars and a scarcity of materials needed by construction firms are the major supply problems troubling distributors.

Extra tonnages of sheets can be obtained from the mills. Most tubular products are easy to obtain. Supplies of hot-rolled bars are becoming more plentiful.

Distributors are accepting full quotas and are making good headway in balancing stocks of the lighter products as to sizes and grades. Ground continues to be lost in the rebuilding of plate, shape and large carbon bar stocks.

Consumer demand for most products, except plates and structurals, has declined owing to attempts of small industries to trim inventories before the year end. Bookings by distributors will approximate those in October in the heavier carbon product classification and will be about 5 to 10 per cent better on specialties and alloys.

On the West Coast, distributors report that November sales will be off about 5 per cent from those of the preceding month, although over-all fourth quarter sales should equal those recorded in the like period a year ago.

Structural Shapes . . .

Structural Shape Prices, Page 151

Extended deliveries of fabricated steel and the increasing cost of financing work are retarding action on structural jobs. But most fabricating shops have more work than they can readily handle.

Structural mills are making some progress on shipping delinquent tonnage. Right now they are three or four weeks behind schedule.

Fabricators are still short of plain material, but they are gearing fabricating operations to the tonnage of available steel. Part of the improvement in mill shipments is due to production blankouts, although output from enlarged capacity also is a factor.

Large shop backlogs, and an upturn in estimating in the weeks ahead, indicate no important easing in structural supply in the near in structural supply in the near up at Buffalo: "Tremendous demand—limited supply." Construction projects throughout upstate New York are being held up by the delay in steel shipments.

The Dominion Bridge Co., Vancouver, B. C., is low bidder on one of the major Pacific Northwest projects of the year, contract No. 2 for the Second Narrows bridge, at Vancouver. It is bid at $12,399,122, and involves more than 1000 tons of steel for the main span, superstructure, approaches and reinforced concrete deck.

The Kansas City Structural Steel Co., Kansas City, has been awarded 2300 tons of shapes for the Air Force Academy at Colorado Springs, Colo.

Philadelphia area fabricators report structural shipments are improving somewhat, noticeably on wide flange sections. This does not necessarily mean that the fabricating shops are able to buy heavier tonnage. But it is enabling them to get in more tonnage due on old orders. District shops are booked well ahead, but new awards are not as heavy as they were some weeks back.

Seasonal sag in demand for structurals and other building steel is noted at Cleveland. Before the local market are a number of small projects, including a $250,000 plant at Bedford, O., for the Thompson Electric Co., Cleveland; two churches, one for the Westlake Christian Church, costing $500,000, and one for the Catholic Diocese of Cleveland, costing $450,000; a shopping center consisting of 30 to 40 stores and a 20-unit or more apartment is projected at a cost of $3,500,000 by Victor V. Van Cantford, 3502 Norwood street, Cleveland. The Catholic Ladies Slovak Union plans a home for the aged at Beachwood, O., at a cost of $500,000, while plans are under way for an elementary school between 91st street and 92nd street, north of Wade Park Ave., Cleveland, to cost about $1,300,000.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5500 tons, assembly plant, Ford Motor Co., Chicago, to Taylor & Gaskin Inc., Detroit.

2300 tons or more, Air Force Academy, Colorado Springs, Colo., to Kansas City Structural Steel Co., Kansas City, $687,645; general contract to Garnsworth & Chambers Inc., Houston, at $19,400,000.

1725 tons, including bearing piles, state highway bridges, Polk county, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

500 tons, coal conveyors, Clinch river power plant, Carbo, Va., Appalachian Electric Power Co., to Bristol Steel & Iron Works Inc., Bristol, Va.

415 tons, including bearing piles, state highway bridges, Scott county, Iowa, to Clinton Bridge Division, Allied Structural Steel Co., Clinton, Iowa.

425 tons, including bearing piles, state highway bridges, Polk county, Iowa, to Pittsburg-Des Moines Steel Co., Des Moines, Iowa.

230 tons, tobacco warehouse, Greenville, Tenn., Hogan Bros. Construction Co., contractor, to Bristol Steel & Iron Works Inc., Bristol, Va.

195 tons, warehouse and office building, Kraft Foods, Philadelphia, to Bethlehem Fabricators, Bethlehem, Pa.

180 tons, manufacturing plant, General Electric Co., Hancock, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Thompson Construction Co., Albany, N.Y., general contractor; 70 tons, reinforcing bars, Albany Steel & Iron Supply Co.

160 tons, 3-span I-beam bridge over the Boston & Maine railroad, Greenfield, Mass., to the Builders Iron Works, Somerville, Mass.; Warner Bros., Sunderland, Mass., is general contractor.

150 tons, vocational high school, Waltham, Mass., to Waghorne-Brown Co., (Bethlehem Fabricators Inc.) Boston; Park Construction Co., Boston, general contractor.

100 tons or more, manufacturing plant, Homelite Division, Textron Inc., Gastonia, N. C., to Carew Steel Products Co., York, Pa.; Daniel Construction Co. Inc., Greenville, N. C., is general contractor.

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Added to the already broad use of Standard and Pearlitic Malleable castings in automotive assemblies are crankshafts such as these — a small one cylinder 3-pounder and the 80 lb., 8-counterweight shaft for a V-8 engine.

Pearlitic Malleable was chosen for these, for its excellent rigidity, uniform structure, design adaptability, and dimensional uniformity — an aid in accurate balancing.

Production costs are reduced because there's less excess stock to be removed, certain machining operations are eliminated and malleable is *easier to machine* — with resulting greater tool and grinding wheel life.

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Malleable FOUNDERS' SOCIETY

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STRUCTURAL STEEL PENDING

3675 tons, Colorado river bridge, Glen Canyon dam, near Lees Ferry, Ariz.; bids Dec. 18, Bureau of Reclamation, Kanab, Utah; also 180 tons, reinforcing bars.

2800 tons, Fashion Institute of Technology, a city school project, Manhattan, New York, Depot Construction Co., low on general contract.

2700 tons, 700-ft. five-span deck girder bridge, superstructure, contract 5655; bids Dec. 5, Division of Purchases, Joseph L. Byron, state house, Providence, R. I.

1500 tons, hangars and miscellaneous buildings, Navy Department, Willow Grove, Pa.; bids Dec. 13.

1460 tons, H-piles, Hartford-Springfield expressway, Windsor, Windsor Locks and East Windsor, Conn.; bids direct to the state, delivery to be at rate of 500 tons monthly starting April 1, 1957.

1000 tons or more, Second Narrows bridge, Vancouver, B.C.; Dominion Bridge Co., Vancouver is low at $12,399,112 to the British Columbia Toll Highways & Bridges Authority, Victoria, B.C.

530 tons, Oregon state Willamette river bridge; Manson Construction & Engineering Co., Seattle, is low at $1,090,150 and $1,187,980 on two schedules.

250 tons, 20 transmission towers and accessories, Bonneville Power Administration, Creamer & Dunlap, Tulsa, Okla., low at $114,443, destination; Bethlehem Pacific Coast Steel Corp., Seattle, is low at $112,541, f.o.b. shipping point.

REINFORCING BARS . . .

REINFORCING BARS PLACED

750 tons, reconstruction, Longfellow bridge, Cambridge, Mass., to the Bethlehem Steel Co., Bethlehem, Pa.; J. F. White Construction Co., Cambridge, is general contractor.

100 tons, vocational high school, Waltham, Mass., to Joseph T. Ryerson & Son Inc., Boston; Park Construction Co., Boston, general contractor.

100 tons or more, Oregon state Yamhill county deck girder bridge; general contract to Tom Lillebo, Reedsport, Oreg., low at $96,533.

REINFORCING BARS PENDING

7250 tons, Clear Creek tunnel, Trinity River Division, Central Valley project, Redding, Calif.; bids Dec. 20, Bureau of Reclamation, Weaverville, Calif.; also 4000 tons, steel tunnel supports.

825 tons, 16-span plate girder and composite I-beam bridge, Byram river, Greenwich, Conn.-Port Chester, N. Y.

365 tons, substructure, Division street bridge, Pawtucket, R. I.

285 tons, Military road bridge, Rock Creek NW, District of Columbia; also 3850 linear feet of steel H-piles.

120 tons, also metal gates, pipe, etc., laterals and pump stations, near Smyrna, Wash.; Cherf Bros. & Sandkay Contractors Inc., Ephrata, Wash., low at $888,958 to the Bureau of Reclamation.

100 tons or more, $1.5 million YMCA building, Yakima, Wash.; bids Dec. 13.

100 tons, Idaho state Owyhee county bridge; general award to Stuart Bros., Twin Falls, Idaho, low at $85,772.

PLATES . . .

PLATES PENDING

275 tons, 500,000-gal elevated water storage tank, Arlington county, Virginia; bids Nov. 30.

PIPE . . .

CAST IRON PIPE PLACED

150 tons or more, 3000 to 5000 ft, 10-in., to U.S. Pipe & Foundry Co., Seattle, by Chehalis, Wash.

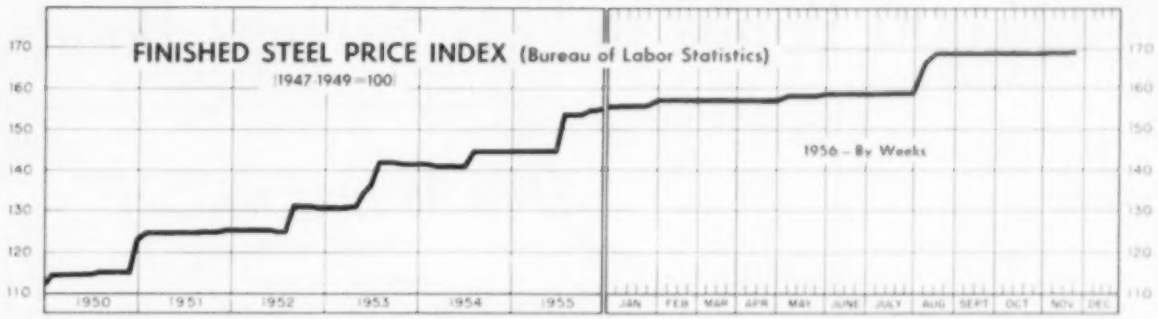
CAST IRON PIPE PENDING

705 tons, 18, 16 and 12-in., Alderwood Manor, Wash.; Frank Coluccio, Seattle, is low at $192,372 for cast iron; $185,577 for coated steel pipe; Matt Malaspina, Seattle, is low at $169,600 for concrete cylinder.

577 tons, system expansion, Eugene, Oreg.; bids in.

125 tons, Cedar river line extension, Seattle; bids in.

Price Indexes and Composites



Nov. 20, 1956	Week Ago	Month Ago	Oct. Avg.	Year Ago
168.8	168.8	168.6	168.6	154.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 20

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150
Rails, Light, 40 lb	6.567
Tie Plates	6.625
Axles, Railway	8.900
Wheels, Freight Car, 33 in. (per wheel)	57.50
Plates Carbon	5.550
Structural Shapes	5.267
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H. R., Alloy, High Speed, W. 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.025
Bars, H.R., Stainless, 303 (lb)	0.483
Bars, H.R., Carbon	5.925
Bars, Reinforcing	5.738
Bars, C.F., Carbon	9.610
Bars, C.F., Alloy	13.275
Bars, C.F., Stainless, 302 (lb)	0.508
Sheets, H.R., Carbon	5.695
Sheets, C.R., Carbon	6.439
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.635
Sheets, Electrical	11.225
Strip, C.R., Carbon	8.843
Strip, C.R., Stainless, 403 (lb)	0.475
Strip, H.R., Carbon	5.900
Pipe, Black, Buttweld (100 ft)	18.376
Pipe, Galv., Buttweld (100 ft)	22.516
Pipe, Line (100 ft)	152.860
Casing, Oil Well, Carbon (100 ft)	178.046
Casing, Oil Well, Alloy (100 ft)	276.870
Tubes, Boiler (100 ft)	45.033
Tubing, Mechanical, Carbon (100 ft)	22.972
Tubing, Mechanical, Stainless, 304 (100 ft)	187.133
Tin Plate, Hot-dipped, 1.25 lb	9.433
Tin Plate, Electrolytic, 0.25 lb	8.133
Black Plate, Canmaking Quality	7.233
Wire, Drawn, Carbon	9.175
Wire, Drawn, Stainless, 430 (lb)	0.630
Bale Ties (bundle)	7.213
Nails, Wire, 8d Common	9.368
Wire, Barbed (80-rod spool)	8.412
Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 21 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	228.93	228.92	228.86	208.90	171.92
Index in cents per lb	6.111	6.111	6.111	5.659	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$137.68	$137.68	$137.48	$128.14	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.90	52.54
Basic Pig Iron, GT	63.18	63.18	63.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	62.00	61.50	57.00	46.33	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 21 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.35	5.35	5.35	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.40	5.40	5.40	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.20	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.85	$9.45	$8.70

*Including 0.25c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.90
Wire rods, ⅜-⅝" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Nov. 21 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld, Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld, Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld, Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	235.00†	190.00†	168.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$62.50	$62.50	$55.50	$45.50	$44.00
No. 1 Heavy Melt, E. Pa.	59.00	59.00	57.50	48.00	42.50
No. 1 Heavy Melt, Chicago	64.50	63.00	58.00	45.50	42.50
No. 1 Heavy Melt, Valley	66.50	66.50	63.50	48.00	44.00
No. 1 Heavy Melt, Cleve.	65.00	65.00	61.50	45.50	43.00
No. 1 Heavy Melt, Buffalo	59.50	59.50	57.50	43.50	43.00
Rails, Rerolling, Chicago	87.50	87.50	84.00	66.50	52.50
No. 1 Cast, Chicago	59.50	59.50	59.50	48.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

Delta Air Lines Gives $225,000 Bonus in U. S. Savings Bonds

C. E. WOOLMAN
President and General Manager
DELTA AIR LINES

Delta Air Lines, Inc.

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TO: All Members of Delta Family

FROM: President and General Manager

This has been a difficult but successful year. Each of us has had a hand in our accomplishments.

Again we want to share our good fortune with all our people and it is a pleasure to announce that all personnel with more than six months of service as of May 24, 1956, will receive a $50.00 U.S. Savings Bond. All personnel with six months of service or less as of that date will receive a $25.00 U.S. Savings Bond. The total value of these bonds will be about $225,000.00.

The bond is both a share in our achievements and an added expression of appreciation for your contribution to them.

C.E. Woolman

Delta

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STEEL
The Metalworking Weekly

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in *italics*. Code numbers following mill points indicate producing company. Key to producers page 152; to footnotes, page 154.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$70.50

INGOTS, Alloy (NT)

Detroit R7	$74.00
Houston S5	74.00
Midland,Pa. C18	74.00
Munhall,Pa. U5	74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$74.00
Bessemer,Pa. U5	74.00
Bridgeport,Conn. N19	79.00
Buffalo R2	74.00
Clairton,Pa. U5	74.00
Ensley,Ala. T2	74.00
Fairfield,Ala. T2	74.00
Fontana,Calif. K1	83.50
Gary,Ind. U5	74.00
Johnstown,Pa. B2	74.00
Lackawanna,N.Y. B2	74.00
LoneStar,Tex. L6	80.00
Munhall,Pa. U5	74.00
Pittsburgh J5	74.00
S.Chicago,Ill. R2, U5	74.00
S.Duquesne,Pa. U5	74.00
Sterling,Ill. N15	74.00
Youngstown R2	74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5	$91.50
Bessemer,Pa. U5	91.50
Bridgeport,Conn. N19	96.50
Buffalo R2	91.50
Canton,O. R2	94.00
Clairton,Pa. U5	91.50
Conshohocken,Pa. A3	96.50
Ensley,Ala. T2	91.50
Fairfield,Ala. T2	91.50
Fontana,Calif. K1	101.00
Gary,Ind. U5	91.50
Geneva,Utah C11	91.50
Houston S5	96.50
Johnstown,Pa. B2	91.50
Lackawanna,N.Y. B2	91.50
LosAngeles B3	101.00
Midland,Pa. C18	91.50
Munhall,Pa. U5	91.50
Pittsburgh J5	91.50
Seattle B3	105.00
S.Chicago R2, U5, W14	91.50
S.Duquesne,Pa. U5	91.50
S.SanFrancisco B3	101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$107.00
Bridgeport,Conn. N19	107.00
Buffalo R2	107.00
Canton,O. R2	107.00
Conshohocken,Pa. A3	114.00
Detroit R7	107.00
Fontana,Calif. K1	128.00
Gary,Ind. U5	107.00
Houston S5	112.00
Ind.Harbor,Ind. Y1	107.00
Johnstown,Pa. B2	107.00
Lackawanna,N.Y. B2	107.00
LosAngeles B3	127.00
Massillon,O. R2	107.00
Midland,Pa. C18	107.00
Munhall,Pa. U5	107.00
S.Chicago R2,U5,W14	107.00
S.Duquesne,Pa. U5	107.00
Struthers,O. Y1	107.00
Warren,O. C17	107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19	$116.50
Buffalo R2	111.50
Canton,O. R2	114.00
Cleveland R2	111.50
Gary,Ind. U5	111.50
S.Chicago,Ill. R2,W14	111.50
S.Duquesne,Pa. U5	111.50

SKELP

Aliquippa,Pa. J5	4.725
LoneStar,Tex. L6	5.625
Munhall,Pa. U5	4.625
SparrowsPoint,Md. B2	4.625
Warren,O. R2	4.625
Youngstown R2, U5	4.625

WIRE RODS

AlabamaCity,Ala. R2	5.80
Aliquippa,Pa. J5	5.00
Alton,Ill. L1	6.00
Buffalo W12	5.80
Cleveland A7	5.80
Donora,Pa. A7	5.80
Fairfield,Ala. T2	5.80
Houston S5	6.05
IndianaHarbor,Ind. Y1	5.80
Johnstown,Pa. B2	5.80
Joliet,Ill. A7	5.80
KansasCity,Mo. S5	6.05
Kokomo,Ind. C16	5.90
LosAngeles B3	6.60
Minnequa,Colo. C10	6.65
Monessen,Pa. P7	5.80
N.Tonawanda,N.Y. B11	5.80
Pittsburg,Calif. C11	6.45
Portsmouth,O. P12	5.80
Roebling,N.J. R5	5.90
S.Chicago,Ill. R2	5.80
SparrowsPoint,Md. B2	5.90
Sterling,Ill.(1) N15	5.80
Sterling,Ill. N15	5.90
Struthers,O. Y1	5.80
Worcester,Mass. A7	6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	5.00
Aliquippa,Pa. J5	5.00
Bessemer,Ala. T2	5.00
Bethlehem,Pa. B2	5.05
Birmingham C15	5.30
Clairton,Pa. U5	5.00
Fairfield,Ala. T2	5.00
Fontana,Calif. K1	5.70
Gary,Ind. U5	5.00
Geneva,Utah C11	5.00
Houston S5	5.10
Ind.Harbor,Ind. I-2	5.00
Johnstown,Pa. B2	5.05
KansasCity,Mo. S5	5.10
Lackawanna,N.Y. B2	5.05
LosAngeles B3	5.70
Minnequa,Colo. C10	5.30
Munhall,Pa. U5	5.00
Niles,Calif. P1	5.75
Phoenixville,Pa. P4	5.85
Portland,Oreg. O4	5.80
Seattle B3	5.75
S.Chicago,Ill. U5, W14	5.00
S.SanFrancisco B3	5.65
Sterling,Ill. N15	5.00
Torrance,Calif. C11	5.70
Weirton,W.Va. W6	5.00

Wide Flange

Bethlehem,Pa. B2	5.05
Clairton,Pa. U5	5.00
Fontana,Calif. K1	5.85
IndianaHarbor,Ind. I-2	5.00
Lackawanna,N.Y. B2	5.05
Munhall,Pa. U5	5.00
Phoenixville,Pa. P4	5.85
S.Chicago,Ill. U5	5.00

Alloy Std. Shapes

Clairton,Pa. U5	6.20
Gary,Ind. U5	6.20
Houston S5	6.30
Munhall,Pa. U5	6.20
S.Chicago,Ill. U5	6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	7.35
Bessemer,Ala. T2	7.35
Bethlehem,Pa. B2	7.40
Clairton,Pa. U5	7.35
Fairfield,Ala. T2	7.35
Fontana,Calif. K1	8.05
Gary,Ind. U5	7.35
Geneva,Utah C11	7.35
Houston S5	7.45
Ind.Harbor,Ind. I-2, Y1	7.35
Johnstown,Pa. B2	7.40
KansasCity,Mo. S5	7.45
Lackawanna,N.Y. B2	7.40
LosAngeles B3	8.05
Munhall,Pa. U5	7.35
Seattle B3	8.10
S.Chicago,Ill. U5, W14	7.35
S.SanFrancisco B3	8.00
Struthers,O. Y1	7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	7.40
Ind.Harbor,Ind. I-2	7.35
Lackawanna,N.Y. B2	7.40
Munhall,Pa. U5	7.35
S.Chicago,Ill. U5	7.35

PILING

BEARING PILES

Bethlehem,Pa. B2	5.65
Lackawanna,N.Y. B2	5.65
Munhall,Pa. U5	5.60
S.Chicago,Ill. U5	5.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.90
Lackawanna,N.Y. B2	5.90
Munhall,Pa. U5	5.90
S.Chicago,Ill. U5	5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.95
Aliquippa,Pa. J5	4.85
Ashland,Ky. (15) A10	4.85
Bessemer,Ala. T2	4.85
Bridgeport,Conn. N19	4.75
Clairton,Pa. U5	4.85
Claymont,Del. C22	5.35
Cleveland J5, R2	4.95
Coatesville,Pa. L7	5.25
Conshohocken,Pa. A3	4.90
Detroit M1	4.95
Ecorse,Mich. G5	4.95
Fairfield,Ala. T2	4.85
Fontana,Calif.(30) K1	5.55
Gary,Ind. U5	4.85
Geneva,Utah C11	4.85
GraniteCity,Ill. G4	5.05
Harrisburg,Pa. P4	5.80
Houston S5	4.95
Ind.Harbor,Ind. I-2, Y1	4.85
Johnstown,Pa. B2	4.85
Lackawanna,N.Y. B2	4.85
LoneStar,Tex. L6	5.20
Minnequa,Colo. C10	5.70
Munhall,Pa. U5	4.85
Newport,Ky. N9	4.85
Pittsburgh J5	4.85
Riverdale,Ill. A1	4.85
Seattle R3	5.75
Sharon,Pa. S3	4.85
S.Chicago,Ill. U5, W14	4.85
SparrowsPoint,Md. B2	4.85
Steubenville,O. W10	4.85
Warren,O. R2	4.85
Weirton,W.Va. W6	4.85
Youngstown R2, U5, Y1	4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	6.20
Fontana,Calif. K1	6.70
Geneva,Utah C11	6.00
Johnstown,Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	7.25
Bessemer,Ala. T2	7.25
Clairton,Pa. U5	7.25
Claymont,Del. C22	7.55
Cleveland J5, R2	7.25
Coatesville,Pa. L7	7.65
Conshohocken,Pa. A3	7.25
Ecorse,Mich. G5	7.35
Fairfield,Ala. T2	7.25
Fontana,Calif.(30) K1	7.95
Gary,Ind. U5	7.25
Geneva,Utah C11	7.25
Houston S5	7.35
Ind.Harbor,Ind. I-2, Y1	7.25
Johnstown,Pa. B2	7.25
Munhall,Pa. U5	7.25
Pittsburgh J5	7.25
Seattle B3	8.15
Sharon,Pa. S3	7.25
S.Chicago,Ill. U5, W14	7.25
SparrowsPoint,Md. B2	7.25
Warren,O. R2	7.25
Youngstown U5, Y1	7.25

PLATES Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.85
Coatesville,Pa. L7	6.85
Fontana,Calif.(30) K1	7.55
Gary,Ind. U5	6.85
Houston S5	6.95
Ind.Harbor,Ind. Y1	6.85
Johnstown,Pa. B2	6.85
Munhall,Pa. U5	6.85
Newport,Ky. N9	6.85
Seattle B3	7.75
Sharon,Pa. S3	6.85
S.Chicago,Ill. U5, W14	6.85
SparrowsPoint,Md. B2	6.85
Youngstown Y1	6.85

FLOOR PLATES

Cleveland J5	5.925
Conshohocken,Pa. A3	5.925
Harrisburg,Pa. P4	6.275
Ind.Harbor,Ind. I-2	5.925
Munhall,Pa. U5	5.925
S.Chicago,Ill. U5	5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10	5.10
Ashland l.c.l. (15) A10	5.60
Cleveland c.l. R2	5.60
Warren,O. c.l. R2	5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2	5.075
Aliquippa,Pa.(9) J5	5.075
Alton,Ill. L1	5.275
Atlanta(9) A11	5.575
Bessemer,Ala.(9) T2	5.075
Birmingham(9) C15	5.375
Bridgeport,Conn. N19	5.30
Buffalo(9) R2	5.075
Clairton,Pa. U5	5.075
Cleveland(9) R2	5.075
Ecorse,Mich.(9) G5	5.175
Emeryville,Calif. J7	5.85
Fairfield,Ala.(9) T2	5.075
Fairless,Pa.(9) U5	5.225
Fontana,Calif.(9) K1	5.775
Gary,Ind.(9) U5	5.075
Geneva,Utah(9) C11	5.157
Houston(9) S5	5.325
Ind.Harbor(9) I-2, Y1	5.075
Johnstown,Pa.(9) B2	5.075
Joliet,Ill. P22	5.575
KansasCity,Mo.(9) S5	5.325
Lackawanna(9) B2	5.075
LosAngeles(9) B3	5.775
Milton,Pa.(23) M18	5.425
Minnequa,Colo. C10	5.525
Niles,Calif. P1	5.85
N.Tonawanda,N.Y.(9) B11	5.075
Pittsburg,Calif.(9) C11	5.775
Pittsburgh(9) J5	5.075
Portland,Oreg. O4	5.85
Seattle B3, N14	5.825
S.Ch'c'go(9)R2,U5,W14	5.075
S.Duquesne,Pa.(9) U5	5.075
S.SanFran.,Calif.(9) B3	5.825
Sterling,Ill.(1) N15	5.075
Sterling,Ill. N15	5.175
Struthers,O. Y1	5.075
Torrance,Calif.(9) C11	5.775
Weirton,W.Va.(9) W6	5.075
Youngstown(9) R2, U5	5.075

BARS, H.R. Loaded Alloy (Including leaded extra)

Warren,O. C17	7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	6.125
Bridgeport,Conn. N19	6.20
Buffalo R2	6.125
Canton,O. R2	6.125
Clairton,Pa. U5	6.125
Detroit R7	6.125
Ecorse,Mich. G5	6.225
Fairless,Pa. U5	6.275
Fontana,Calif. K1	7.175
Gary,Ind. U5	6.125
Houston S5	6.375
Ind.Harbor,Ind. I-2,Y1	6.125
Johnstown,Pa. B2	6.125
KansasCity,Mo. S5	6.375
Lackawanna,N.Y. B2	6.125
LosAngeles B3	7.175
Massillon,O. R2	6.125
Midland,Pa. C18	6.125
S.Chicago R2, U5, W14	6.125
S.Duquesne,Pa. U5	6.125
Struthers,O. Y1	6.125
Warren,O. C17	6.125
Youngstown U5	6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	7.625
Bessemer,Ala. T2	7.625
Bethlehem,Pa. B2	7.625
Bridgeport,Conn. N19	7.50
Clairton,Pa. U5	7.625
Cleveland R2	7.625
Ecorse,Mich. G5	7.525
Fairfield,Ala. T2	7.625
Fontana,Calif. K1	8.125
Gary,Ind. U5	7.625
Houston S5	7.675
Ind.Harbor,Ind. Y1	7.625
Johnstown,Pa. B2	7.625
KansasCity,Mo. S5	7.675
Lackawanna,N.Y. B2	7.625
LosAngeles B3	8.125
Pittsburgh J5	7.625
Seattle B3	8.175
S.Chicago,Ill. U5, W14	7.625
S.DuquesnePa. U5	7.625
S.SanFrancisco B3	8.175
Struthers,O. Y1	7.625
Youngstown U5	7.625

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2	5.225
Houston S5	5.325
KansasCity,Mo. S5	5.325
Lackawanna(9) B2	5.075
Sterling,Ill. N15	5.175
Sterling,Ill.(1) N15	5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	5.075
Atlanta A11	5.575
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.85
Pittsburgh J5	5.075
Portland,Oreg. O4	5.85
SanFrancisco B7	5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	6.20
Gary,Ind. U5	6.20
Houston S5	6.45
Chicago W18	6.45
KansasCity,Mo. S5	6.45
Youngstown U5	6.20

BARS, C.F. Loaded Alloy (Including leaded extra)

Ambridge,Pa. W18	9.475
BeaverFalls,Pa. M12	9.475
Chicago W18	9.475
Cleveland C20	9.475
LosAngeles S30	11.10
LosAngeles P2	11.00
Monaca,Pa. S17	9.225
Newark,N.J. W18	9.65
Warren,O. C17	9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	6.85
BeaverFalls,Pa. M12,R2	6.85
Bridgeport,Conn. N19	7.20
Buffalo R5	6.90
Camden,N.J. P13	7.30
Carnegie,Pa. C12	6.85
Chicago W18	6.85
Cleveland A7, C20	6.85
Detroit R5, P17	7.05
Detroit R7	6.85
Donora,Pa. A7	6.85
Elyria,O. W8	6.85
FranklinPrk,Ill. N5	6.85
Gary,Ind. U5	6.85
GreenBay,Wis. F7	6.85
Hammond,Ind. L2, M13	6.85
Hartford,Conn. R2	7.30
Harvey,Ill. R5	6.85
LosAngeles(49) S30	8.30
LosAngeles P2, R2	8.30
Mansfield,Mass. B5	7.40
Massillon,O. R2, R8	6.85
Midland,Pa. C18	6.85
Monaca,Pa. S17	6.85
Newark,N.J. W18	7.30
NewCastle,Pa.(17) B4	6.85
Pittsburgh J5	6.85
Plymouth,Mich. P6	7.10
Putnam,Conn. W18	7.40
Readville,Mass. C14	7.40
S.Chicago,Ill. W14	6.85
SpringCity,Pa. K3	7.30
Struthers,O. Y1	6.85
Waukegan,Ill. A7	6.85
Youngstown F3, Y1	6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	8.325
BeaverFalls,Pa. M12,R2	8.325
Bethlehem,Pa. B2	8.325
Bridgeport,Conn. N19	8.475
Buffalo R5	8.325
Camden,N.J. P13	8.50
Canton,O. T7	7.425
Carnegie,Pa. C12	8.325
Chicago W18	8.325
Cleveland A7, C20	8.325
Detroit R5, P17	8.525
Detroit R7	8.325
Donora,Pa. A7	8.325
Elyria,O. W8	8.325
FranklinPark,Ill. N5	8.325
Gary,Ind. R2	8.325
GreenBay,Wis. F7	8.325
Hammond,Ind. L2, M13	8.325
Hartford,Conn. R2	8.625
Harvey,Ill. R5	8.325
Lackawanna,N.Y. B2	8.325
LosAngeles P2, S30	10.10
Mansfield,Mass. B5	8.625
Massillon,O. R2, R8	8.325
Midland,Pa. C18	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
Plymouth,Mich. P5	8.525
S.Chicago W14	8.325
SpringCity,Pa. R3	8.50
Struthers,O. Y1	8.325
Warren,O. C17	8.325
Waukegan,Ill. A7	8.325
Worcester,Mass. A7	8.625
Youngstown F3, Y1	8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	5.075
Atlanta A11	5.575
Birmingham C15	5.375
Bridgeport,Conn. N19	5.30
Buffalo R2	5.075
Cleveland R2	5.075
Ecorse,Mich. G5	5.425
Emeryville,Calif. J7	5.85
Fairfield,Ala. T2	5.075
Fairless,Pa. U5	5.225

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 .5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.85
SandSprings,Okla. S5..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2.5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance, Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ½-1" B2.6.73
KansasCity,Mo. S5 ....7.00
Marion,O. P11 .....6.70
New York U8 .....7.15
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 ....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) P5 ....5.60
Franklin,Pa.(3) P5 ....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O. (3) P11 ....5.15
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19.5.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ..13.15
McK.Rks.(D.R.) L5 ..18.00
McK.Rks.(Staybolt)L5 .19.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 ....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago, Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Dravosburg,Pa. U5 ....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ..6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 .5.75
Steubenville, O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Wierton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky.	A10 6.65	6.90
Canton,O.	R2 ..6.65	7.15
Dravosburg	U5 ..6.65	6.90
Fairfield	T2 ....6.65	6.90
Gary,Ind.	U5 ....6.65	6.90
GraniteCity,Ill.	G4 6.85	...
Ind.Harbor	I-2 ..6.65	6.90
Kokomo,Ind.	C16 6.75	...
MartinsFry.	W10 6.65	...
Pitts.,Calif.	C11..7.40	...
SparrowsPt.	B2..6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg,Pa. U5 ....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30†
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30†
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ...6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ..6.30†
Kokomo,Ind. C16 .....6.40‡
MartinasFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ..7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ...9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ....8.175
Yorkville,O. W10 .. 8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest SteelRoll Mill
N15 Northwestern S.&.W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div. U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co., Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.675
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.675
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill. (1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg,Pa. U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.70	....	....
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	....
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	16.80	20.65	....
Buffalo W12	...	16.80	....	....
FranklinPark, Ill. T6	...	17.15	21.00	25.35
Harrison,N.J. C18	...	16.80	20.65	25.00
New York W3	...	16.80	20.65	25.00
Palmer,Mass. W12	...	16.80	....	....
Trenton,N.J. R5	...	16.80	20.65	25.00
Worcester,Mass. W12	...	14.80	....	....
Worcester,Mass. A7, T6	...	16.80	20.65	25.00
Youngstown C8	...	17.15	21.00	25.35

STRIP, Hot-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*†	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*†	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*†	12.075*†	13.05*†
Vandergrift,Pa. U5	...	10.85†	11.525*†	12.575*†	13.55*†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

	Transformer Grades			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

	Grain Oriented					
C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Dravosburg,Pa. U5	8.40	8.65	9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975		
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Dravosburg,Pa. U5	9.70	9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Ind.Harbor Y1	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Dravosburg,Pa. U5	7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Dravosburg,Pa. U5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)	
Dravosburg,Pa. U5	$9.20
Gary,Ind. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)	
Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.80

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.88

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Clevelsnd A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester A7, J4, T6	9.025

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.85
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C16	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C22	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R8	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS, Stock — Col.

AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta A11	166
Bartonville, Ill. (7) K4	169
Chicago (7) W13	167
Cleveland (7) A9	173
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex S5	169
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
Kansas City,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. (7) P7	167
Pittsburgh,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt., Md. B2	166
Sterling,Ill.(1) N15	164
Worcester,Mass. A7	170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock — Col.

AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta A11	166
Bartonville,Ill (7) K4	169
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
Kansas City,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (1) N15	164
Worcester,Mass. A7	170

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	10.13
Buffalo W12	10.03
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	9.53
Duluth A7	9.53
Houston S5	9.78
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
KansasCity,Mo. S5	9.78
Kokomo,Ind. C16	9.63
LosAngeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.63
Sterling,Ill.(1) N15	9.53

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	9.85
Duluth A7	9.85
Houston S5	10.10
Kokomo,Ind. C16	9.95
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
KansasCity,Mo. S5	10.10
Kokomo,Ind. C16	10.45
LosAngeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.65
SparrowsPt.,Md. B2	9.95
Sterling,Ill.(1) N15	9.85

Coil Interim

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	9.90
Duluth A7	9.90
Houston S5	10.15
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
KansasCity,Mo. S5	10.15
Kokomo,Ind. C16	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
SparrowsPt.,Md. B2	10.00
Sterling,Ill.(1) N15	9.90

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	184**
Aliquippa,Pa. J5	184†
Atlanta A11	190*
Bartonville Ill. K4	193
Crawfordsville,Ind. M8	193
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	185*
Joliet,Ill. A7	184†
KansasCity,Mo. S5	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	191*
Pittsburg Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	207**
SparrowsPoint,Md. B2	190*
Sterling,Ill(1) N15	188*

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J5	184†
Atlanta A11	182*
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(1) N15	180*

WIRE (16 gage)	**An'ld**	**Galv.**
	Stone	**Stone**
Ala.City,Ala.R2	15.70	17.25**
Bartonville K4	16.10	18.05
Buffalo W12	16.10	—
Cleveland A7	15.70	17.25†
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Houston S5	15.95	17.50**
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05*
Kan.City,Mo.S5	15.95	17.50**
Kokomo C16	15.80	17.35†
Minnequa C10	16.45	18.15**
P'lm'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	15.70	17.25†
Worcester A7	16.00	—

WIRE, Merchant Quality (6 to 8 gage)	**An'ld**	**Galv.**
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	8.10	8.625†
Atlanta A11	8.05	8.65†
Bartonville(48) K4	8.20	8.80
Buffalo W12	8.10	8.50†
Cleveland A7	7.95	—
Crawfordsville M8	8.20	8.80
Donora,Pa. A7	7.95	8.35†
Duluth A7	7.95	8.35†
Fairfield T2	7.95	8.35†
Houston(48) S5	8.20	8.80**
Jacks'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	7.95	8.55*
Joliet,Ill. A7	7.95	8.35†
Kans.City(48) S5	8.20	8.80**
Kokomo C16	8.05	8.45†
LosAngeles B3	8.00	9.50*
Minnequa, C10	8.20	8.60**
Monessen P7 (48)	8.10	8.70*
Palmer,Mass. W12	8.40	8.80*
Pitts.,Calif. C11	8.90	9.30†
Portsmouth,O. P12	8.10	—
Rankin,Pa. A7	7.95	8.35†
S.Chicago R2	7.95	8.35**
S.SanFran. C10	8.90	9.30**
Spar'waPt. B2(48)	8.05	8.65*
Sterling(1)(48)N15	7.95	8.55*
Struth'rs,O.(48)Y1	7.95	8.45†
Worcester,Mass.A7	8.25	8.65†

Based on zinc price of: *13.50c. 15c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	190
Atlanta A11	192
Bartonville,Ill. K4	197
Crawfordsville,Ind. M8	197
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston S5	195
Jacksonville,Fla. M8	202
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo.C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
SparrowsPoint.,Md. B2	192
Sterling,Ill. N15	190
Tonawanda,N.Y. R12	189
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington W. Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
S.Chicago,Ill. R2	167
Sterling,Ill. N15	167
Tonawanda,N.Y. R12	169
Williamsport,Pa. S19	175

FASTENERS

(Based discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller;	
6 in. and shorter	55
Longer than 6 in.	46.5
⅝ in. thru 1 in.:	
6 in. and shorter	46.5
Longer than 6 in.	44
1⅛ in. and larger:	
All lengths	44
Undersized Body (rolled thread):	
½ in. and smaller:	
6 in. and shorter	55

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	35
Longer than 6 in.	23
⅝ in. thru 1 in.:	
6 in. and shorter	20
Longer than 6 in.	20
1⅛ in. and larger:	
All lengths	20

Lag Bolts

All diameters:	
6 in. and shorter	55
Longer than 6 in.	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	54
Larger than ½ in. or longer than 6 in.	47
Blank Bolts	47
Step, Elevator, Tire Bolts	54

NUTS

Reg. & Heavy Square Nuts:	
All sizes	50
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	46
Hex Nuts, Reg. & Heavy, Hot Pressed:	
⅝ in. and smaller	63
⅝ in. to 1 in. incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger	58
Hex Nuts, Reg. & Heavy, Cold Punched:	
⅝ in. and smaller	63
⅝ in. to 1½ in., incl.	59.5
1⅝ in. and larger	58
Hex Nuts, All Types, Hot Galvanized:	
⅝ in. and smaller	50
⅝ in. to 1 in., incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

⅝ in. and smaller	62
⅝ in. to 1½ in., incl.	59.5
1⅝ in. and larger	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger	58

CAP AND SET SCREWS

(Based discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread
Bright:

6 in. and shorter:	
⅝ in. and smaller	47
¾, ⅞ and 1 in. diam.	31
Longer than 6 in.:	
⅝ in. and smaller	16.5
¾, ⅞ and 1 in. diam.	5.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	34
¾, ⅞ and 1 in. diam.	13
Longer than 6 in.:	
⅝ in. and smaller	+1
¾, ⅞ and 1 in. diam.	+19
Fillister Head, Coarse Thread:	
Listed Sizes	+31
Flat Head, Coarse Head:	
¼ in. and smaller by 6 in. and shorter	+57
Set Screws, Square Head, Cup Point, Coarse Thread:	
Through 1 in. diam.:	
6 in. and shorter	11
Longer that 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
7/8-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13		23.56	22.84
1¼	13		27.92	22.68
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2¾	12	46.98	55.01	44.73
2⅞	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W. Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....		(16)6.00
Lackawanna,N.Y. B2	5.075	4.975		(16)6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.33c; 1 15/16 to 6 in., inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 5 cents lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.85c.
(15) 5/16" and thinner 40 lb and under.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Dedd. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill hands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.35c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9 cents for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 14 Ga. & lighter; 45" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(46) 6-7 Ga.
(49) 1¼-in. and smaller rounds; 8.60c, over 2½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.66		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		22c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	18.5	+3.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	18.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. P5	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	18.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	18.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	18.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	18.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	18.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+6.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+6.75	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.75	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.75	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	2.75	11	+7.25	11	+7.25
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+6.25	13.5	+6.25
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+6.25	13.5	+6.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	35.75	37.25	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.50	46.75	48.25	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	58.50	57.50	60.50	64.25	73.50	73.50
310	42.25	53.75	69.00	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	63.75	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	48.75	48.00	50.25	54.50	60.00	60.00
18-SCbTa	32.75	42.00	50.25	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	50.50	50.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	39.75	41.75	43.50	53.00	53.00
446	....	....	57.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.80	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	43.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.00
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	45.70	54.80	63.85	73.00	....
Nickel	37.95	46.25	54.60	62.95	....
Nickel, Low Carbon	38.25	46.90	55.60	64.40	....
Monel	40.30	49.10	57.95	66.80	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
*Copper**	*31.40*	*40.65*

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

	Grade by Analysis (%)				
W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.865
18	4	1	....	....	1.680
9	3.5	....	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.155
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M16, S8, U6, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala., R2	56.50	59.00	....	....
Birmingham R2	56.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	56.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W13	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
NewYork, deld.	....	69.01	69.51	....
Newark,N.J., deld.	67.76	68.26	68.76	69.26
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&B sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks,Pa. deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Hankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C15	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.49	....	67.99	68.49
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	66.26	66.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I2, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$97.50
NiagaraFalls,N.Y. P15	97.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	102.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.055% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	76.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	76.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.‖	H.R. Alloy 4140††‖		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.18	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.13	....	8.27	8.34	8.97	9.69‖	15.69	8.57	8.12	10.31
Birmingham	7.65‖	8.85‖	8.85‖	....	7.78	7.91	9.44	10.04	....	8.05	8.01	10.24
Boston	8.70	9.73	11.02	....	8.79	8.85	9.43	10.71	14.46	8.90	8.56	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.68	9.96	....	8.27	8.23	9.95
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.24
Cincinnati	7.82	8.89	9.75	....	8.08	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.05	8.35	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60‖	....	7.90	8.00	8.65	8.70‖	....	8.35	8.20	9.50
Houston	8.70	9.65	10.90	....	8.80	8.54	9.09	10.55	15.00	8.99	8.60	10.10
Jackson, Miss.	8.00‖	9.30‖	9.32‖	....	8.10	8.23	8.78	10.14	....	8.37	8.33	10.06
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.38
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.79	....	7.78	8.36	...
New York	8.35	9.58	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.75	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	...	8.60	8.10	9.80
Philadelphia	7.89	9.08	10.13	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.65	8.88	10.06	80.00	7.85	7.91	8.44	8.60	13.95	8.05	8.01	9.28
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	8.29	9.49	10.31	....	8.39	8.52	...	9.21	....	8.75	8.71	9.87
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	10.45	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	10.50	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‖includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; ‖42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ‖—400 to 999 lb; ‖—1000 to 1999 lb; ‖—2000 to 2999 lb; ‖—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., Luning, Nev., $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	32.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$29.00-30.00
Domestic, scheelite, mine	55.00

Manganese Ore

Mn 48%, contract, nominally $1.35-1.40, per long ton unit, c.i.f. U.S. ports, duty for buyer's account; 46-47%, $1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$52.00-53.00
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of lb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¾ in. x 1.3 in.	24.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00. In standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght, allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	55.10-58.40†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.05
Stainless Steel, 316	$1.40
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten: Dollars	
Melting grade, 99%	
50 to 200 mesh:	
1000 lb and over	4.20
Less than 1000 lb	4.35
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.40	$7.40	$7.40	$7.65
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.50	7.50	7.50	7.80
I-Beams	7.75	7.75	7.75	8.15
Plates	9.50	9.50	9.50	10.00
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.32	27.32	27.32	31.15
Barbed Wire (†)	6.61	6.61	6.61	6.96
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	7.90	7.90	7.90	8.62

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.60-15.50
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	29.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearney, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	38.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.60

Cents per pound, producing point

Phenol: Grade 1, 15.06; Grade 2-3, 14.56; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $102; 19-21% Mn, 1-3% Si, $99.50; 16-19% Mn, $97.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $235, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 33.75c per lb of contained Mn, carload packed 35.05c, ton lots 36.55c, less ton 17.75c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 7.5% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 34.15c per lb of contained Mn, packed, carload 35.45c, ton lot 37.05c, less ton 28.25c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 4% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 48.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 43c; 2000 lb to min carload, 38c; 500 lb to 1999 lb, 37c; 50 lb cans, 37.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.95c per lb of alloy. Packed, c.l. 14.15, ton 14.60c, less ton 15.6c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 20.85c per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lots $1.31, less ton lots $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si. Packed c.l. 16c, ton lot 17.45c, less ton 19.1c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.8c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Boroll: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13.9c per lb of briquet, c.l. packed, pallets 14.1c, bags 15.1c; 3000 lb to c.l., pallets 15.3c; 2000 lb to c.l. bags, 16.3c, less ton 17.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 14.4c per lb of briquet, c.l. packed, pallets, 14.6c; bags 15.6c, 3000 lb to c.l., pallets, 15.8c; 2000 lb to c.l., bags 16.8c; less ton 17.7c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.55c per lb of briquet, packed, pallets, 7.75c; bags 8.75c; 3000 lb to c.l., pallets 9.35c; 2000 lb to c.l. bags 10.35c; less ton 11.25c. Delivered. Spot, add 0.25c. (Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.7c. Packed, pallets 7.9c; bags 8.9c; 3000 lb to c.l. pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.15 per lb of contained W; 2000 lb W to 5000 lb W, $3.25; less than 2000 lb W, $3.37. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lots $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 19c per lb of alloy, ton lots 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 8: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lots 20.15c; less ton lots 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

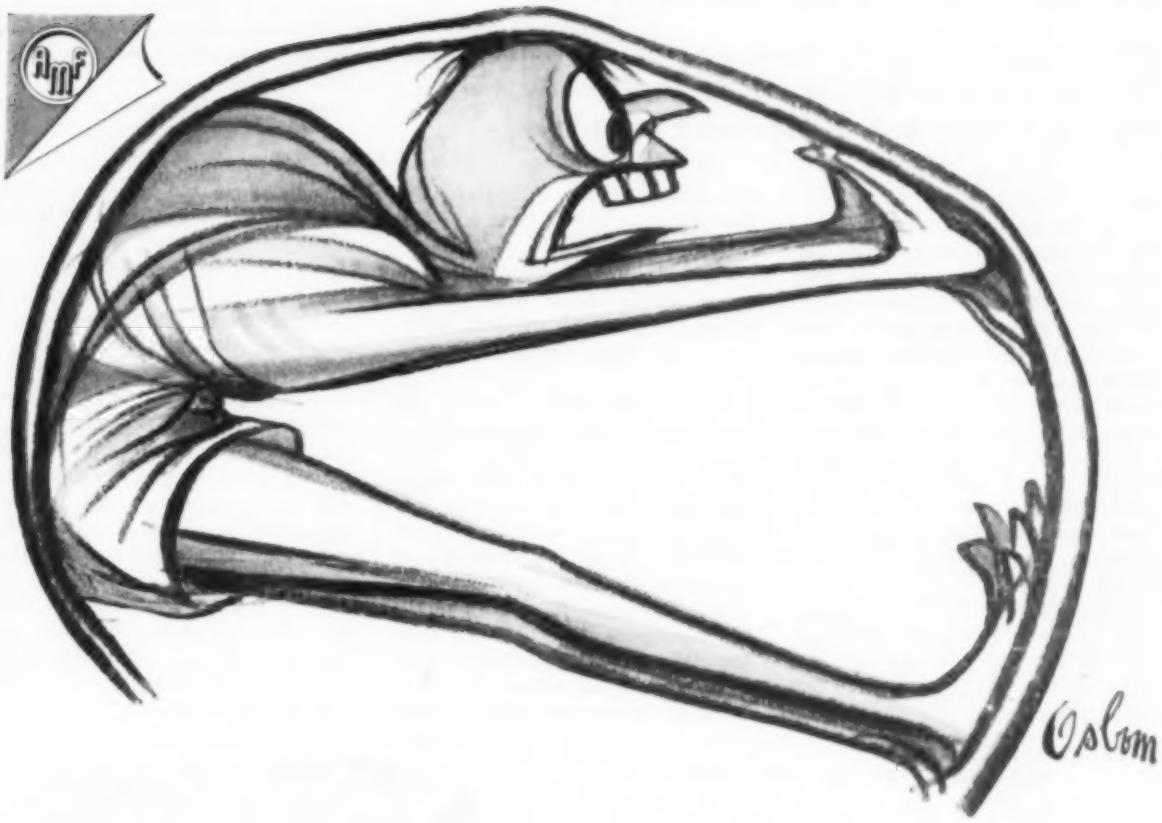
V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lots 19.55c; less ton lots 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $60 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



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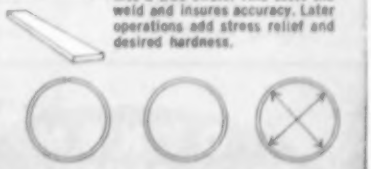

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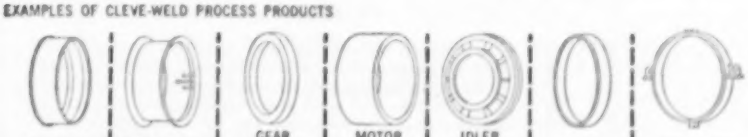

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Scrap Prices Still Advancing

STEEL's composite on the steelmaking grades rises another 50 cents to a record high of $62.00. Market undertone continues firm though buying is somewhat less active

Scrap Prices, Page 102

Chicago — Broker-dealer transactions constitute the yardstick for gaging the scrap market in this area. On this basis prices are approximately $2 a ton higher than a week ago, and this time the cast grades, which have been holding stationary, have moved upward with the steelmaking grades.

The mills hold good inventories despite heavy consumption, and they still are getting substantial deliveries under old contracts. As a result, they show no strong interest in buying.

One mill offers $65 for industrial No. 1 heavy melting, $66 for No. 1 factory bundles and $67 for low-phos electric furnace material. But since these offers are about $2 a ton below current quotations for the grades involved, it is doubtful takers will be found.

Philadelphia—Scrap prices continue strong here, with No. 2 bundles higher at $48-$49, delivered, and heavy turnings at $55-$56.

The longshoremen's strike has retarded the loading of one scrap cargo at this port. But, to date, there has not been much backing up on scrap for export in New York or here, and probably not anywhere along the seaboard as the strike is only a few days old.

The feeling is there will not be too much of a tieup for the reason the strike is so widespread the government will not permit it to continue for any great length of time.

New York — Brokers have advanced their buying prices on machine shop turnings and mixed borings and turnings to $32-$33, on short shoveling turnings to $38-$39. All other steel grades are unchanged. In cast scrap, unstripped motor blocks are higher at $37-$38.

Boston—No. 2 bundles, turnings and borings are quoted up $1, with prices on other steel grades firm. Export buying for dock delivery has been halted because of the dockworkers' strike. Tonnage available for domestic shipment is heavier for district delivery. Brokers are paying $57, shipping point, for cut structurals and plate.

Cleveland — There is no buying on the local market. About the only development of note in this area was the holding up of scrap shipments by a local mill because of congestion at its scrapyard. No new buying is reported in the Valley. Prices continue firm, but unchanged, with No. 1 heavy melting quoted at $64.50-$65.50 here, and $66-$67 in the Valley. Dealers

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and brokers expect a renewal of activity, and possibly an advance in prices, in month-end buying, following the issuance of monthly automotive lists.

Buffalo — Scrap is strong here, though little new business is being done. Prices are firm at the recently established peak levels and general market sentiment continues bullish. There is a continuing demand for outdistrict shipments of No. 1 and No. 2 heavy melting grades. This outside interest, along with local orders, serves to keep the open-hearth grades at peak prices, No. 1 around $60 and No. 2 at $49. The market is expected to remain at present levels the rest of this year. But the cast grades are relatively soft in the local picture, with the foundries showing little interest.

Detroit — The scrap market is steady here. Most dealers think prices will hold through the remainder of this month. New auto lists may bring slightly higher prices. Expectations are scrap volume will increase markedly in December as auto production schedules mount.

Cincinnati—Prices, which are at the highest level on record, continue firm in the local scrap market. No. 1 heavy melting is being quoted at $59-$60, brokers' buying price. Brokers say the scrap supply is "tight." Indications now present—high-level mill operation and tight supply—point to another round of increases in scrap.

St. Louis — The scrap market here is strong, and prices are edging upward. Material continues scarce. The mills hold substantial supplies on the ground, but consumption is heavy. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are quoted at $56, up $1 a ton. Rails, 18-in. and under, are up $1 to $84. Random length rails are quoted at $83, up $1.50.

Birmingham—Open-hearth scrap prices advanced $3 a ton last week when an Alabama mill made limited purchases after being out of the market about 90 days. The prices offered were only sufficient to attract scrap from nearby areas.

Most electric furnace grades are quoted higher. No. 1 cast also went up $1 when a consumer that had been out of the market for some weeks made sizable purchases.

Export buying has not been affected by the dock strike, but it is expected to be if the strike continues any length of time.

Scrap still appears to be in short supply.

San Francisco—A scrap metal plant will be constructed near Porterville, northern California, by the Pacific States Steel Corp., Niles, Calif.

Los Angeles—Some steelmaking scrap prices have dropped slightly, but the market undertone is firm. No. 1 heavy melting fell $2 to $55, and No. 1 bundles dropped $1 to $54. Reversing the trend, No. 1 cupola cast advanced from $60 to $62. The cast scrap market has never been firmer in this area.

Seattle—Scrap leveled off last week, prices dropping $1 to $2. The decline was due to slackened demand from Japan. Domestic buying continues heavy, but receipts are in good volume and buyers are more discriminating.

Heavy purchases by Japan in the last 60 days are reflected in the charter market where rates have been bolstered by the Suez canal difficulties. From California to Japan, a top freight record of $202,500 was paid for a full cargo of approximately 9000 tons, free load and discharge.

Other North Pacific charters have been ranging from $190,000 to $195,000. Charters from North Atlantic and Gulf to Japan have been closed recently at $282,000 to $290,000.

Ferroalloys . . .

Ferroalloy Prices, Page 158

The Inorganic Chemicals Division, Monsanto Chemical., Co., St. Louis, announced an increase of $10 per gross ton in the price of ferrophosphorus, effective Jan. 1, 1957.

(*Please turn to page* 167)

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Nov. 21	$62.00
Nov. 14	61.50
Oct. Avg.	57.27
Nov. 1955	46.08
Nov. 1951	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	62.00-63.00
No. 2 heavy melting	53.00-54.00
No. 1 bundles	62.00-63.00
No. 2 bundles	50.00-51.00
No. 1 busheling	62.00-63.00
Machine shop turnings	43.00-44.00
Mixed borings, turnings	43.00-44.00
Short shovel turnings	47.00-48.00
Cast iron borings	47.00-48.00
Cut structurals, 3 ft lengths	71.00-72.00
Heavy turnings	58.00-59.00
Punchings & plate scrap	71.00-72.00
Electric furnace bundles	71.00-72.00

Cast Iron Grades

No. 1 cupola	52.00-53.00
Heavy breakable cast	50.00-51.00
Unstripped motor blocks	37.00-38.00
No. 1 machinery cast	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	*71.00-72.00*
Rails, 2 ft and under	80.00-81.00
Rails, 18 in. and under	81.00-82.00
Rails, random lengths	79.00-80.00
Railroad specialties	*75.00-76.00*

Stainless Steel Scrap

18-8 bundles & solids	470.00-510.00
18-8 turnings	360.00-400.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	64.50-65.50
No. 2 heavy melting	50.00-51.00
No. 1 bundles	64.50-65.50
No. 2 bundles	44.00-45.00
No. 1 busheling	64.50-65.50
Machine shop turnings	35.00-36.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Cut foundry steel	62.00-63.00
Low phos.	65.50-66.50
Cut structural plates 2 ft and under	71.00-72.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	65.50-66.50

Cast Iron Grades

No. 1 cupola	59.00-60.00
Charging box cast	52.00-53.00
Heavy breakable cast	50.00-51.00
Stove plate	55.00-56.00
Unstripped motor blocks	39.00-40.00
Brake shoes	47.00-48.00
Clean auto cast	57.00-58.00
Burnt cast	44.00-45.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt.	68.00-69.00
R.R. malleable	71.00-72.00
Rails, 2 ft and under	86.00-87.00
Rails, 18 in. and under	87.00-88.00
Rails, random lengths	83.00-84.00
Cast steel	71.00-72.00
Railroad specialties	77.00-78.00
Uncut tires	76.00-77.00
Angles, splice bars	78.00-79.00
Rails, rerolling	85.00-86.00

Stainless Steel

(Broker' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-500.00
18-8 turnings	300.00-310.00
430 clips, bundles, solids	115.00-120.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	66.50-67.00
No. 2 heavy melting	57.00-58.00
No. 1 bundles	66.00-67.00
No. 2 bundles	49.00-50.00
No. 1 busheling	66.00-67.00
Machine shop turnings	36.00-37.00
Short shovel turnings	43.00-44.00
Cast iron borings	43.00-44.00
Low phos.	68.50-69.50
Electric furnace bundles	68.50-69.50

Railroad Scrap

No. 1 R.R. heavy melt.	69.00-70.00

CHICAGO

No. 1 heavy melting	*61.00-66.00*
No. 2 heavy melting	*53.00-54.00*
No. 1 factory bundles	*68.00-69.00*
No. 1 dealer bundles	62.00-63.00
No. 2 bundles	45.00-46.00
No. 1 busheling	*65.00-66.00*
Machine shop turnings	*40.00-42.00*
Mixed borings, turnings	*42.00-44.00*
Short shovel turnings	*42.00-44.00*
Cast iron borings	*42.00-44.00*
Cut structurals, 3 ft	*70.00-71.00*
Punchings & plate scrap	*72.00-73.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*68.00-69.00*
R.R. malleable	70.00-71.00
Rails, 2 ft and under	83.00-84.00
Rails, 18 in. and under	*85.00-86.00*
Angles, splice bars	76.00-77.00
Rails, rerolling	*87.00-88.00*

Stainless Steel Scrap

18-8 bundles & solids	505.00-515.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	60.00-65.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	59.00
No. 2 heavy melting	48.00-49.00
No. 1 bundles	60.00
No. 2 bundles	46.00
No. 1 busheling	59.00
Machine shop turnings	31.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	64.00-65.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	*44.00-45.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	*46.00-47.00*
Cast iron borings	25.00-26.00
Short shovel turnings	*37.00-38.00*
Machine shop turnings	*36.00-37.00*
Bar crops and plate	*60.00-61.00*
Structural & plate, 2 ft	*58.00-59.00*
Electric furnace bundles	*54.00-55.00*
Cut foundry steel	*52.00-53.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*52.00-53.00*
Stove plate	51.00-52.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*58.00-59.00*
Rails, 18-in. and under	74.00-75.00
Rails, rerolling	77.00-78.00
Rails, random lengths	69.00-70.00
Angles, splice bars	66.00-67.00

PHILADELPHIA

No. 1 heavy melting	59.00
No. 2 heavy melting	49.00
No. 1 bundles	59.00
No. 2 bundles	*48.00-49.00*
No. 1 busheling	59.00
Electric furnace bundles	61.00-62.00
Mixed borings, turnings	41.00
Machine shop turnings	42.00
Short shovel turnings	45.00-46.00
Heavy turnings	*55.00-56.00*
Structurals & plates	66.00-67.00
Couplers, springs, wheels	72.00
Rails, crops, 2 ft & under	81.00-82.00

Cast Iron Grades

No. 1 cupola	52.00-54.00
Malleable	68.00†
Heavy breakable cast	57.00
Drop broken machinery	58.00-59.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	43.00-44.00
No. 1 bundles	53.00-54.00
No. 2 bundles	41.00-42.00
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*38.00-39.00*
Low phos. (structural & plate)	55.00-56.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	*37.00-38.00*
Heavy breakable	48.00-49.00

Stainless Steel

18-8 sheets, clips, solids	475.00-485.00
18-8 borings, turnings	300.00-325.00
430 sheets, clips, solids	110.00-115.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	*47.50-48.50*
No. 1 bundles	51.00-52.00
No. 2 bundles	36.50-37.00
No. 1 busheling	51.00-52.00
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*34.00-35.00*
No. 1 cast	45.00-45.50
Mixed cupola cast	41.00-42.00
No. 1 machinery cast	46.00-47.00

BUFFALO

No. 1 heavy melting	59.00-60.00
No. 2 heavy melting	48.00-49.00
No. 1 bundles	59.00-60.00
No. 2 bundles	43.00-44.00
No. 1 busheling	59.00-60.00
Mixed borings, turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Short shovel turnings	36.00-37.00
Cast iron borings	34.00-35.00
Low phos.	60.00-61.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	68.00-69.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00-60.00
No. 2 heavy melting	49.00-50.00
No. 1 bundles	59.00-60.00
No. 2 bundles	43.00-44.00
No. 1 busheling	59.00-60.00
Machine shop turnings	39.00-40.00
Mixed borings, turnings	37.50-38.50
Short shovel turnings	42.00-43.00
Cast iron borings	37.50-38.50
Low phos. 18 in.	65.00-66.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	64.00-65.00
Rails, 18 in. and under	80.00-81.00
Rails, random lengths	71.00-72.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*50.00*
No. 2 heavy melting	45.00
No. 1 bundles	*56.00*
No. 2 bundles	41.00
No. 1 busheling	*56.00*
Machine shop turnings	32.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	46.00
Heavy breakable cast	46.00
Unstripped motor blocks	43.00
Brake shoes	51.00
Clean auto cast	53.00
Stove plate	45.50

Railroad Scrap

No. 1 R.R. heavy melt.	63.00
Rails, 18 in. and under	*84.00*
Rails, rerolling	88.00
Rails, random lengths	*83.00*
Angles, splice bars	71.00

SEATTLE

No. 1 heavy melting	*54.00*
No. 2 heavy melting	*51.00*
No. 1 bundles	*51.00*
No. 2 bundles	*31.00*
Machine shop turnings	*28.00*
Mixed borings, turnings	*28.00*
Electric furnace No. 1	*60.00*

Cast Iron Grades

No. 1 cupola	*50.00*
Heavy breakable cast	*48.00*
Unstripped motor blocks	*48.00*
Stove plate (f.o.b. plant)	*40.00*

LOS ANGLES

No. 1 heavy melting	*55.00*
No. 2 heavy melting	54.00
No. 1 bundles	*54.00*
No. 2 bundles	47.00
Machine shop turnings	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*62.00*

SAN FRANCISCO

No. 1 heavy melting	54.00
No. 2 heavy melting	52.00
No. 1 bundles	53.00
No. 2 bundles	43.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	48.00
Drop broken machinery	60.00

HAMILTON, ONT.

No. 1 heavy melting	52.00
No. 2 heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Busheling, new factory: Prepared	50.00
Unprepared	46.00
Short steel turnings	35.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

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Metals Business Gains

Sales continue to show some improvement. Motordom still holds the key to a better than average December. Tension in the Middle East spurs sales of tin

Nonferrous Metal Prices, Pages 166 & 167

NONFERROUS metals sales are improving. The gradual, but steady, build-up heralds a strong first quarter.

Lead — Good across-the-board sales are being given an added lift by the tetraethyl lead and cable makers. Government statistics (first seven months of 1956) show sales to the tetraethyl lead industry have increased 24 per cent over sales in the same period last year. During the same period, cable manufacturers have purchased 18 per cent more lead—this pace can be attributed to a growing demand for underground power transmission cable (copper cable with lead sheathing).

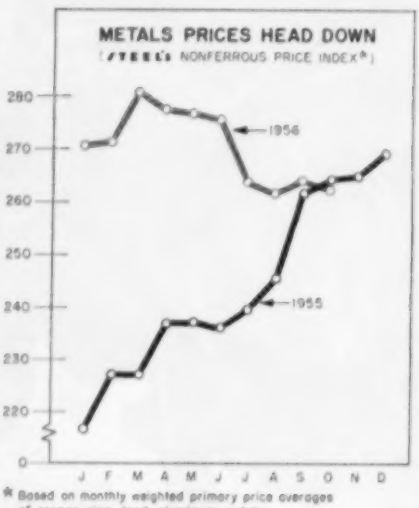
Zinc—Diecasters are building up zinc inventories slowly. Most are no longer taking minimum contract commitments. There is a growing optimism that December will be a better than average month. Demand from galvanizers is helping keep the market firm at 13.50 cents a pound.

Copper — Brass mill sales and shipments are registering small gains. One brass mill executive told STEEL: "It looks as though Detroit has finally entered the market for steel. This means that we'll be next." Brass mills supplying the electronic industry report stepped up sales.

World production of refined copper reached 263,292 tons in October, reports the Copper Institute. This was an increase of 45,770 tons over September totals. U.S. production of refined copper reached 136,379 tons in October. While world deliveries to fabricators improved (234,365 tons in October vs. 219,479 tons in September), refined stocks continued to mount during the period (333,207 tons vs. 309,351 tons). U.S. shipments to fabricators were 113,353 tons. U.S. stocks jumped from 93,202 tons at the end of September to 106,120 tons on Nov. 10.

The favorable supply situation is keeping the London Metal Exchange price from skyrocketing as Middle East tension grows. It remains near 35 cents a pound.

Tin—A New York dock strike sent the price of tin to $112.375 last week. Quotations for November ($109.65) and December ($106.75) were not affected so drastically.



* Based on monthly weighted primary price averages of copper, zinc, lead, aluminum and tin

While some tin buyers had been holding off on January purchases, hoping that the closing of the Texas City tin smelter would bring prices down, most are now ordering to cover January and February needs. Middle East tension is responsible for the change.

Aluminum — Independent diecasters are being caught in a credit squeeze. With orders from Detroit delayed, they are having difficulty paying for delivered aluminum. When motordom starts to order in volume, the independents will have to pay for the inventoried metal before they will be able to get more. If customers are slow in paying, diecasters could run out of aluminum. One help: If the independents get firm contracts, producers may be more lenient.

Aluminium Ltd. plans to spend an initial $100 million to bring a new bauxite and alumina industry to French West Africa. Plans call for the development of bauxite deposits in the northwest area of French Guinea, construction of 75 miles of railroad, building of storage and port facilities and a chemical works capable of producing 250,000 tons of aluminum annually.

Record Year—U.S. production of primary aluminum totaled 149,127 tons in October, says the Aluminum Association. September tally: 132,316 tons. Production for the year through October: 1,385,777 tons. Guesstimate: Look for primary aluminum production, which was hampered by a strike, to reach 1.67 million tons this year.

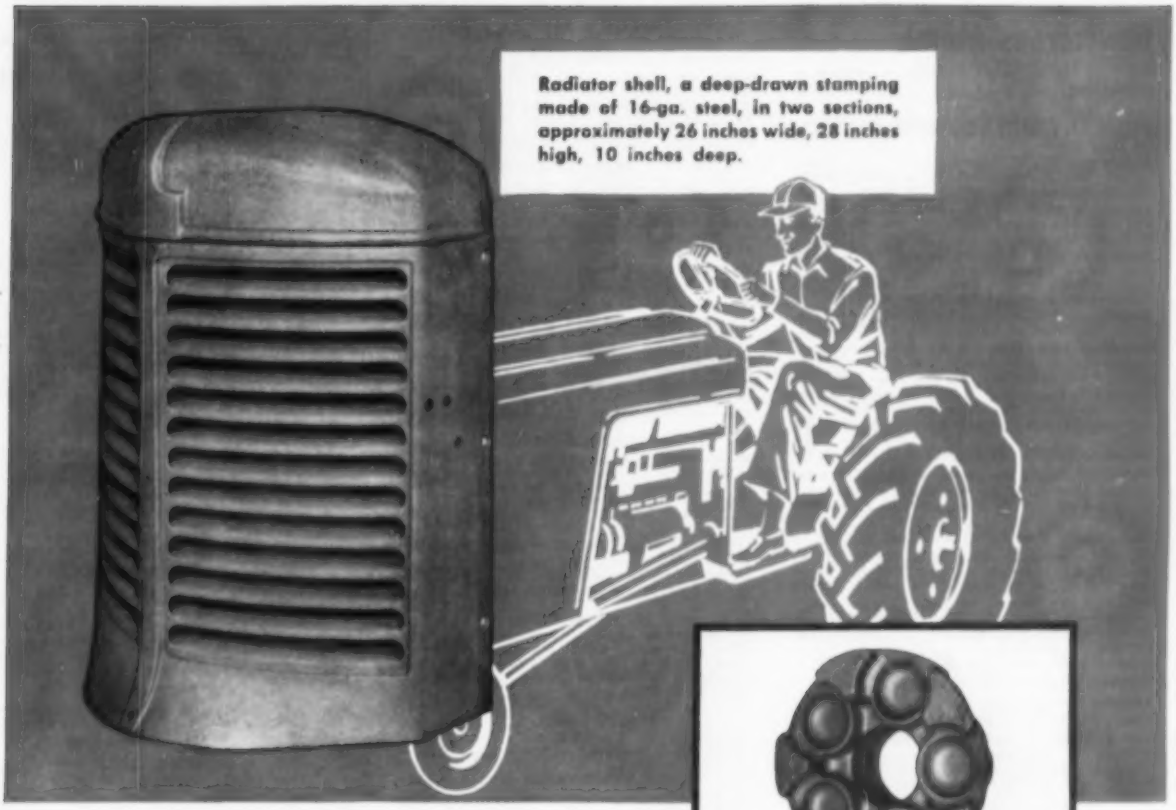
Market Memo

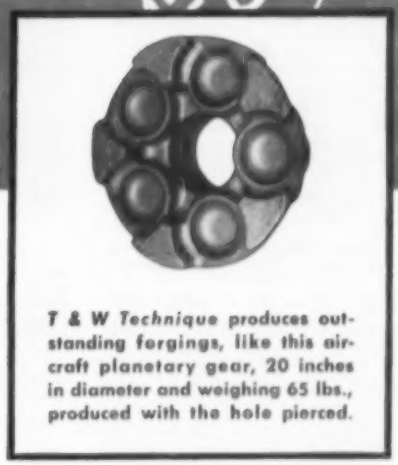
- If Middle East tension continues, look for controls on nickel.

NONFERROUS PRICE RECORD

	Price Nov. 20	Last Change		Previous Price	Oct. Avg.	Sept. Avg.	Nov., 1955 Avg.
Aluminum ..	27.10	Aug.	10, 1956	25.90	27.100	27.100	24.400
Copper	36.00	Oct.	31, 1956	35.00-36.00	36.365	39.500	44.420
Lead	15.80	Jan.	13, 1956	16.30	15.850	15.800	15.300
Magnesium .	35.25	Aug.	13, 1956	33.75	35.250	35.250	32.500
Nickel	64.80	Nov.	21, 1954	60.00	64.500	64.500	64.500
Tin	113.25	Nov.	19, 1956	112.75	105.981	103.745	97.825
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	13.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.0%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.


Radiator shell, a deep-drawn stamping made of 16-ga. steel, in two sections, approximately 26 inches wide, 28 inches high, 10 inches deep.



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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 13, 28.90; No. 43, 28.70; 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $5.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. valley; 36.00 deld. Midwest; custom smelters, 36.00 deld.; lake, 36.00 deld.; fire refined, 35.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 +%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 38.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.66; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $103-$108 per troy oz from refineries.

Radium: $16-$21.80 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 113.25; prompt, 111.125.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.2% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.25-30.00; No. 12 foundry alloy (No. 2 grade), 23.50-24.00; 5% silicon alloy, 0.60 Cu max, 26.00-26.25; 13 alloy, 0.60 Cu max, 26.00-26.25; 195 alloy, 26.00-26.50; 108 alloy, 24.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 23.00, grade 3, 22.25; grade 4, 21.75.

Brass Ingot: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 39.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy). Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 41.355; l.c.l, 41.98. Weatherproof, 30,000-lb lots, 40.78; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.68; l.c.l., 49.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	113	97	118
Strip, C. R.	111	99	128
Plate, H.R.	107	98	111
Rod, Shapes, H.R.	94	80	99
Seamless Tubes	144	120	190

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed):

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-50.90	40.40-44.70
0.029-0.024	44.90-52.40	41.90
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	58.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.80	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-63.80
12-14	46.20-47.70	62.20-64.80
15-17	46.40-48.30	63.50-65.90
18-20	47.00-48.90	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 7.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.63b	54.88c	....	57.82	32.000	32.000	31.250
Yellow Brass	49.44	46.17d	49.98	52.35	24.625	24.375	22.625
Low Brass, 80%	52.65	52.59	53.19	55.46	27.375	27.125	26.625
Red Brass, 85%	53.79	53.73	54.33	56.60	28.500	28.250	27.750
Com. Bronze, 90%	55.48	55.42	56.02	58.04	29.500	29.250	28.750
Manganese Bronze	57.13	51.23	61.47	....	23.000	22.750	22.250
Muntz Metal	51.44	47.35	....	....	23.125	22.875	22.375
Naval Brass	53.39	47.70	60.45	56.55	23.000	22.750	22.250
Silicon Bronze	61.44	60.63	61.48	63.36	31.250	31.000	30.250
Nickel Silver, 10%	66.16	60.20g	67.49	....	30.125	29.875	15.063
Phos. Bronze, A, 5%	76.25	76.75	76.75	77.93	33.000	32.750	31.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 28.25-28.75; No. 2 heavy copper and wire, 26.75-27.25; light copper, 24.25-24.75; No. 1 composition red brass, 24.50-25.00; No. 1 composition turnings, 23.50-24.00; yellow brass turnings, 13.50-14.00; new brass clippings, 20.50-21.00; light brass, 14.00-14.50; heavy yellow brass, 16.00-16.50; new brass rod ends, 18.00-18.50; auto radiators, unsweated, 18.00-18.50; cocks and faucets, 18.50-19.00; brass pipe, 19.50-20.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-14.50.

Monel: Clippings, 75.00-90.00; old sheets, 75.00-80.00; turnings, 70.00-80.00; rods, 75.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.00-19.00; 3003 clippings, 18.00-19.00; 6151 clippings, 18.00-19.00; 5052 clippings, 18.00-18.50; 2014 clippings, 17.00-18.50; 2017 clippings, 17.00-18.50; 2024 clippings, 17.00-18.50; mixed clippings 17.00-17.50; old sheets, 15.50-16.00; old cast, 15.50-16.00; clean old cable (free of steel), 18.00; borings and turnings, 15.75-16.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 58.00; light scrap, 54.00; turnings and borings, 38.00.

Copper and Brass: No. 1 heavy copper and wire, 31.50; No. 2 heavy copper and wire, 30.00; light copper, 27.75; refinery brass (60% copper) per dry copper content, 28.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 31.50; No. 2 heavy copper and wire, 30.00; light copper, 27.75; No. 1 composition borings, 27.00; No. 1 composition solids, 27.50; heavy yellow brass solids, 19.00; yellow brass turnings, 18.00; radiators, 21.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 54.29; oval, 53.42, 5000-10,000 lb; electrodeposited, 45.75; 2000-5000 lb lots; cast, 48.04, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-490 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 128.50; 200-499 lb, 127.00; 500-999 lb, 126.50; 1000 lb or more, 126.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.
Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.
Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4000 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 76.20; 100-500 lb, 67.40; 700-1900 lb, 64.90; 2000-9900 lb, 63.20; 10,000 lb or more, 62.00.

Stannous Chloride (anhydrous): Less than 25 lb, 174.40; 25 lb, 139.40; 100 lb, 124.40; 400 lb, 122.00; 5200-19,600 lb, 109.80; 20,000 lb or more, 97.60.

Stannous Sulphate: Less than 50 lb, 136.80; 50 lb, 106.80; 100-1900 lb, 104.80; 2000 lb or more, 102.80.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 55.55.

(*Concluded from page 161*)

This brings the price of lump size in carload quantities to $10 a gross ton. Other sizes and quantities also are to be increased $10 a ton.

The increase reflects increased manufacturing, mining and power costs for the operations of the elemental phosphorus electric furnace plants.

Iron Ore . . .

Iron Ore Prices, Page 157

Shipments of Lake Superior iron ore in the week ended Nov. 19 totaled 1,846,513 gross tons, reports the Lake Superior Iron Ore Association. This compared with 1,733,871 tons in the like week a year ago.

Shipments to Nov. 19 are reported at 73,344,690 tons, off 11,941,449 tons from the 85,286,139 tons moved up to Nov. 19 in the 1955 season.

Total stocks of iron ore (domestic and imported) in the U.S. and Canada on Oct. 1 were 53,906,551 gross tons, reports the Lake Superior Iron Ore Association and the American Iron & Steel Institute. This compares with 53,304,764 tons on Sept. 1.

Stocks of Lake Superior ore on Oct. 1 were: 39,136,573 tons U.S. ore, and 2,076,331 tons, Canadian. Ore in stock from other U.S. mining areas totaled 2,837,799 tons. Canadian ore, other than Lake Superior, totaled 4,863,206 tons, and imported ore stocks amounted to 4,992,642 tons.

Consumption of ore in September totaled 11,432,300 gross tons, compared with 10,971,450 tons in July and August, combined.

Total consumption in the first nine months of this year is reported at 89,815,800 tons, including 57,468,116 tons of U.S. Lake Superior ore, 2,541,335 tons of Canadian Lake Superior ore, 13,496,068 tons of other U.S. ores, 5,163,469 tons of other Canadian ores and 11,146,812 tons of foreign ores.

As of Nov. 15 there were 255 Great Lakes ore vessels in commission—this amounts to 100 per cent trip capacity (3,008,760 gross tons). The same number of vessels were in service on Oct. 15. On Nov. 1, 1955, only 244 ships were in operation.

Pig Iron . . .

Pig Iron Prices, Page 156

Some automotive foundries have gone from a five to a six-day work week and have asked suppliers for more pig iron. It's not clear whether expanded operations reflect a faster tempo in auto assemblies or a move to offset the loss of output during the Thanksgiving holiday week.

Partly as a result of this development, pig iron shipments this month are expected to be the largest of any in the fourth quarter. They are significantly higher than those in October. Sales for the full year are expected to be 10 per cent larger than those in 1955.

Most of the excess iron inventories accumulated in midyear to beat the anticipated increase in prices and to counteract production losses from the steel strike have been dissipated.

Paralleling the increased demand for pig iron is a pickup in orders for foundry coke.

Complaints are being made in the western New York foundry trade that southern foundries are underpricing northern producers. This outside competition is reported to have caused a slight reduction in operations at some foundries in the Buffalo district.

Considerable Buffalo - produced

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STEEL NAIL BURRS. Cleaned, dry and free of sawdust, steady accumulation approx. 10 ton monthly. Samples sent on request.
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S.E. Cor. 61st & Vine Sts.
Philadelphia 39, Pa.

Positions Wanted

MECHANICAL ENGINEER, age 41, graduate. 18 years plant layout, design, specifications, contract procedure and new construction, principally seamless and welded tube mills with related facilities and plant services. Engaged past ten years administrative staff work. Desires relocate as assistant or department head. Midwest or far west. Present salary five figures. Appropriate responses acknowledged. Reply Box 492, STEEL, Penton Bldg., Cleveland 13, Ohio.

how to

CUT CORROSION LOSSES

a report by Koppers Company, Inc.

C. U. Pittman
Supervisor Technical Service

Ideally, effective corrosion control should start in the design stage of a new building or unit. The design engineer—by avoiding sharp edges, grooves, thin supporting members, etc.—can eliminate many of the common starting points for corrosion.

But in any case, the first step in preventing corrosion is *adequate preparation of the surface* before applying the protective coating. A really good—and economical—protective coating should *prevent* corrosion, not just cover corrosion products.

* * *

Most authorities agree that there are two chief objectives in good surface preparation: removing contaminating materials and producing a surface that will promote a good mechanical bond with the coating. The life and effectiveness of the coating system depends upon the degree to which you attain either of these objectives.

Actually, a tightly adherent surface of mill scale would make an ideal protective coating in itself—*if* temperatures remained constant. But since the scale and the virgin metal have different co-efficients of expansion, temperature changes and mechanical flexing cause flaking of the mill scale even under coatings. (Note: In over-the-ditch coating, it is not practical to remove all mill scale—buried pipe is not so subject to temperature change.) Another problem with mill scale is that electrochemical action between the mill scale and the metal accelerates corrosion and causes pitting.

Rust provides a certain amount of protection by slowing corrosion. But since it is non-adherent and porous, corrosion continues.

To perform an effective, long-life job, any coating must have a proper surface to which it can adhere. As revealed by photomicrographs, a slight roughness produces the best mechanical bond by increasing surface area and providing a tooth for the coating. Chemical bonding depends on the inherent molecular structure of the coating material. Some coatings must depend on a mechanical bond only. But coal tar coatings, having polar groups, will bond chemically as well as mechanically.

* * *

The important point on which most corrosion engineers agree—and which our applications research has proved—is that surface preparation is an integral part of the coating specification. By paying as careful attention to surface preparation methods as to selecting the right coatings, you will assure trouble-free, economical corrosion control.

* * *

We will report to you soon on the various surface preparation methods. In the meantime, we'd like to hear about your corrosion problems. Write: Koppers Company, Inc., 1301 Koppers Building, Dept. 101L, Pittsburgh 19, Pa. District Offices: Boston, Chicago, Los Angeles, New York, Pittsburgh and Woodward, Ala. In Canada: Koppers Products, Ltd., Toronto, Ontario and Edmonton, Alberta.

KOPPERS

BITUMASTIC
REG. U. S. PAT. OFF.
COATINGS AND ENAMELS

iron is moving west on the Great Lakes, chiefly to the automotive industry. This movement is expected to remain heavy until the close of navigation.

With U.S. Steel relighting its No. 1 blast furnace at the South Works, South Chicago, Ill., on Nov. 17, all the Chicago district's 43 stacks are active. It is the first time since last January and February that operations have been at full capacity.

Pig iron shipments to New England consumers are somewhat slower. The over-all melt is below that averaged in the first six months of the year, notably for machine tools and textile mill equipment.

New England jobbing foundries report their business is holding up, some of them operating close to capacity.

Shipments of iron into New England from Pennsylvania furnaces are smaller, the bulk of area supplies coming from the local district stack and New York state furnaces.

During October, the three blast furnaces at the Middletown Works, Armco Steel Corp. broke all records with a combined production of 107,365 tons of iron. The previous record was set in May when 106,559 tons were produced. Monthly records were smashed by the Middletown and Hamilton No. 2 blast furnaces.

Following a brief suspension, the Birdsboro, Pa., blast furnace of the Colorado Fuel & Iron Corp. is back in operation.

Rails, Cars . . .

Track Material Prices, Page 154

Reflecting improvement in the flow of steel to the railroad equipment industry, freight car building speeded up in October. Deliveries of new cars rose to 5666 from 3444 the month preceding, and compared with 3772 in October, 1955.

Orders for cars also increased in the month. The total was 6532 against 3949 in September. The number was far below the 12,843 units placed in October a year ago.

The backlog of car orders on Nov. 1 amounted to 122,250, against 122,421 on Oct. 1 and 61,964 on Nov. 1, last year.

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RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.
Precision machining is done by skilled craftsmen in our modern machine shop.
Send your blue prints for quotation.

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Mill Housings
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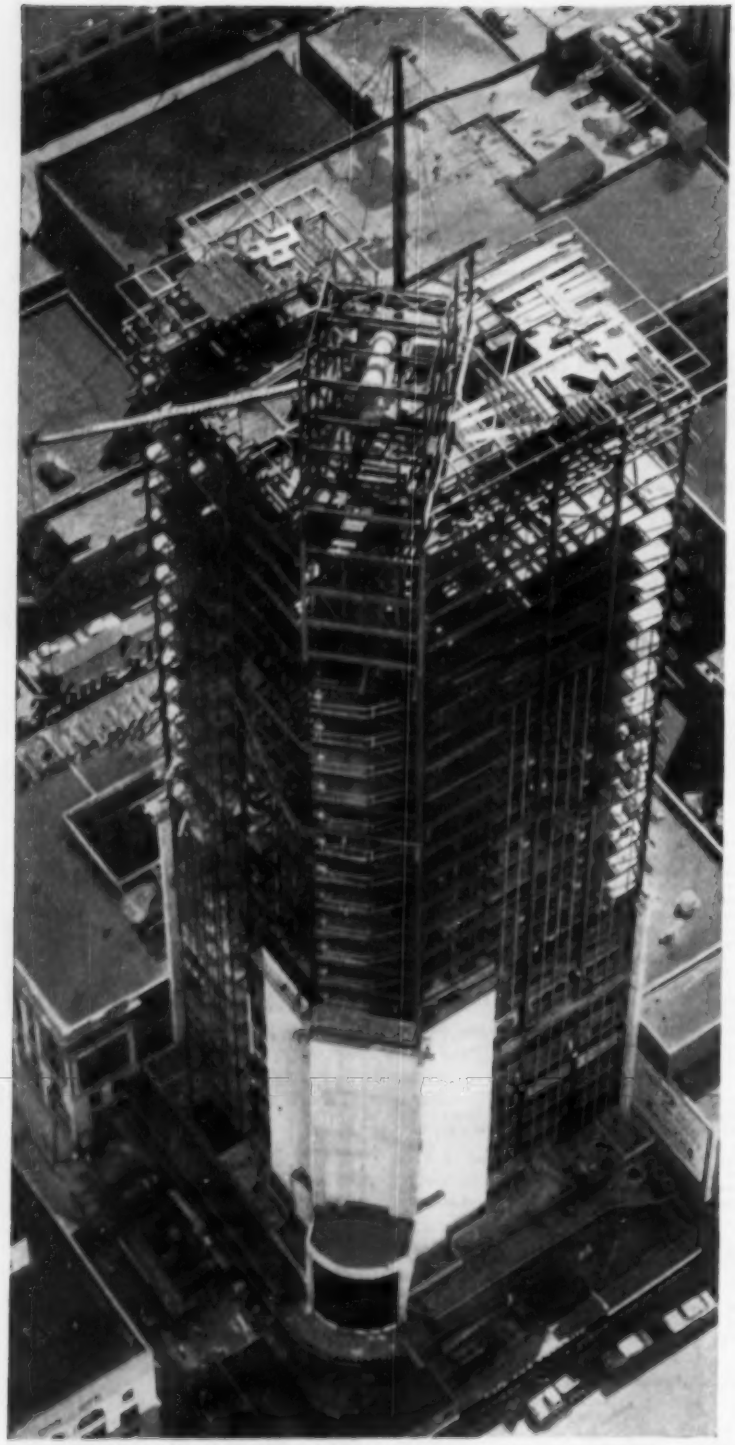
Layout Plates
Surface Plates

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS



Architect: Edwin A. Keeble Associates, Inc.; *Structural Engineer:* Ross H. Bryan
General Contractor: J. A. Jones Construction Co.

Bolted Frame For Nashville Building

Here you have a bird's-eye view of the steelwork for the 30-story home office building erected at Nashville for the Life & Casualty Insurance Company of Tennessee. The framework for the 409-ft structure, weighing about 3,350 tons, was erected quickly and economically by means of bolting. Bethlehem High-Strength Bolts join the structural members.

Bethlehem High-Strength Bolts are ideal for saving time in erecting structural steel. The bolts are used with hardened washers, and are installed by a two-man crew, one using a holding wrench, the other a calibrated impact wrench. Installation is accomplished in seconds, yet each joint is tight and sound.

OTHER ADVANTAGES

High-strength bolting is relatively free from noise, as the impact wrench is less noisy than a riveting gun. Besides, there are no fire hazards involved, for the bolts are installed cold.

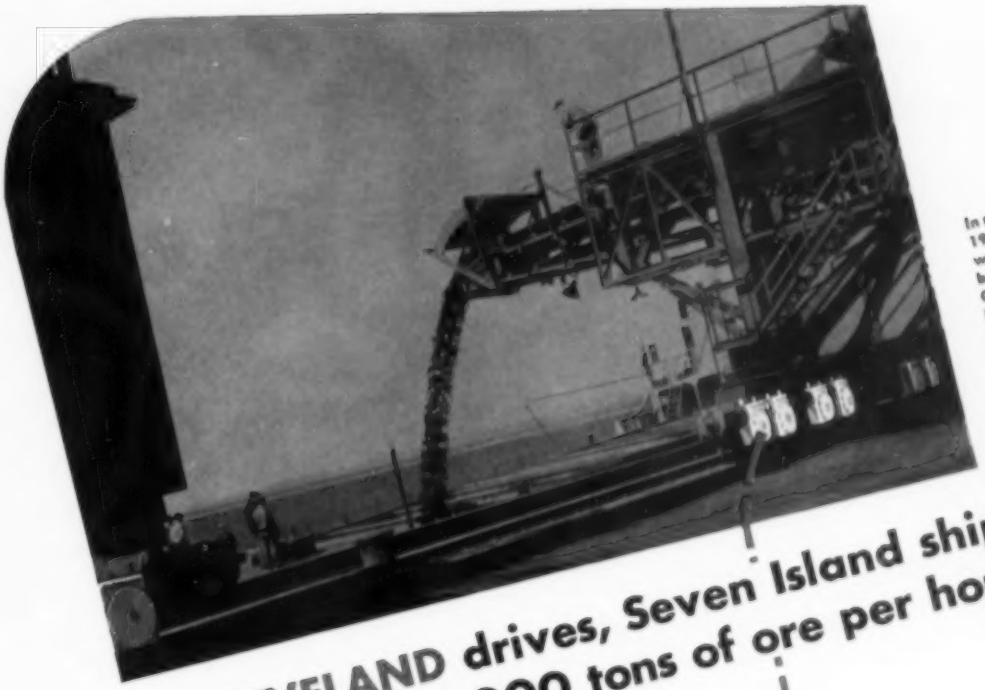
Bethlehem High-Strength Bolts are made of carbon steel in a wide size range. They are heat-treated by quenching and tempering to meet the requirements of ASTM Specification A-325. For full details, drop a line to the nearest Bethlehem sales office.

SEND FOR NEW BOOKLET

We recently issued a 24-page, two-color booklet on high-strength bolting. It is profusely illustrated, and contains a wealth of material for reference. Write today for your copy.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



In service since July, 1954, these drives were manufactured by Cleveland's Canadian licensee, Peacock Bros. Ltd., with worm gear sets supplied from Cleveland.

With 32 CLEVELAND drives, Seven Island shiploaders can handle 8,000 tons of ore per hour

THIS monster shiploader and its twin each have an hourly rated capacity of 4,000 long tons. The two machines thus can load 12,000,000 tons or more during the normal shipping season.

Rich brownish-red iron ore from Labrador and Quebec promises to play an increasing part in supplying the steel mills of the Free World—and in loading every ton of it, Cleveland Worm Gear Speed Reducers have a part. In the photograph showing one of the loaders in action, you can glimpse seven of the 32 specially built Clevelands that are mounted in groups of four on the legs of the loaders. Through them power from the electric motors is applied in order to position and adjust the great steel frames carrying the belt conveyors for quick, accurate delivery of ore into the holds of waiting ships.

Whatever your power transmission job, there's a Cleveland to do it surely, safely, efficiently, economically. Write for Catalog 400. The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

Again and Again and Again

THE CHOICE OF THE LEADERS
THE MARK OF BETTER MACHINES

W. F. & John Barnes, a leading builder of machine tools and automation installations, standardizes on the use of Cutler-Hammer motor control equipment

Barnes Multiple Station "Progress-Thru" Machine which performs a total of 54 operations on automotive cylinder heads in a continuous automatic cycle. Cutler-Hammer Three-Star Motor Control and Heavy Duty Oil-Tight Pushbuttons are standard original equipment.

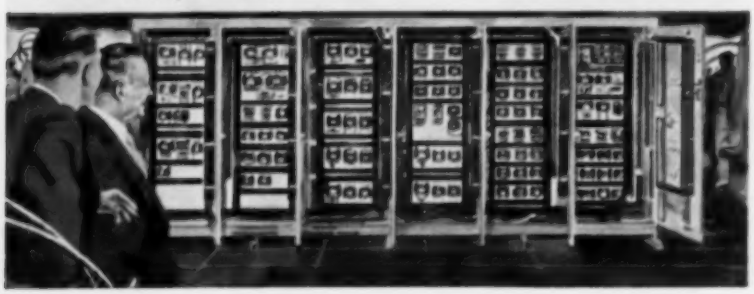
The W. F. & John Barnes Company, Rockford, Illinois, has designed and built highly specialized mechanical, electrical and hydraulic equipment and machines for more than 80 years. Their unusually competent Electrical Division has repeatedly won distinction in the custom designing and building of complex electrical control systems, particularly in advanced automation engineering. Their choice of Cutler-Hammer Three-Star Motor Control and Cutler-Hammer Heavy Duty Oil-Tight Pushbuttons, in their own words, "simply reflects our conviction that these are the very best available."

Cutler-Hammer Three-Star Motor Control and Cutler-Hammer Heavy Duty Oil-Tight Pushbuttons are the decided preference of able engineers whenever selection is determined by careful comparison. To be sure, you too should standardize on Cutler-Hammer . . . the choice of the leaders, the mark of better machines.

CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

N. P. Bashor, Manager, Electrical Division, W. F. & John Barnes Company, recognized as an authority on machine tool control, says, "We are forever seeking improved techniques and equipment for Barnes machines. The extent to which we have standardized on Cutler-Hammer Three-Star Motor Control and Cutler-Hammer Heavy Duty Oil-Tight Pushbuttons simply reflects our conviction that these are the very best available."

CUTLER-HAMMER
MOTOR CONTROL
C-H

Control systems for Barnes machines include the unique Barnes Electro-Graphic Detector which can cut trouble-shooting time as much as 90%. Detector circuits permit simple, speedy and safe pinpointing of any operating difficulties. With this detector, plant electricians do not have to be machine designers to be experts in supervisory maintenance.

Control cabinet doors of Barnes machine opened to show array of Cutler-Hammer Three-Star Motor Control components used.